

557.

THE
PROCEEDINGS
OF THE
ZOOLOGICAL SOCIETY
OF
LONDON.

WITH ILLUSTRATIONS.

1850.

PART III.
JULY—NOVEMBER.
CONTAINING ELEVEN PLATES.

PRINTED FOR THE SOCIETY,
SOLD AT THEIR HOUSE IN HANOVER-SQUARE,
AND BY MESSRS. LONGMAN, BROWN, GREEN AND LONGMANS,
PATERNOSTER-ROW.

[Price 9s.]

Tragelaphus Angasii, Gray, P. Z. S. 1848, 89. t. 4 & 5, male, female and young; Knows. Menag. 27.

Inhabits S. Africa; Port Natal. Brit. Mus. male, imperfect skin.

** *Face without any frontal streak; horns small.*

† *Back with transverse white stripes.*

3. TRAGELAPHUS SCRIPTUS. The ZALOFES or HARNESS ANTELOPE.

Pale bay; back with four cross-bands and a central white streak; haunches white spotted; cheek with two white spots; spot on chest, nose, feet, and spots on the legs blackish; dorsal streak and end of tail black. Adult: chest and outside of shoulder and haunches and legs black: the male with a high ridge of long, coarse white hair extending the whole length of the back to the tail.

Antelope scripta, Pallas, Misc. 8.—*Antelope (Tragelaphus) scripta*, H. Smith.—*A. maculata*, Thunb.—*A. (Tragelaphus) Phalerata*, H. Smith.—*Tragelaphus scripta*, Gray, Knows. Menag. 28. t. 28.—*The Harness Antelope*, Pennant, Syn. 27.—*Guib*, Buffon, H. N. xii. 305, 307. t. 40. t. 41. f. 1; F. Cuv. Mamm. Lithog. t. ; Dict. Sci. Nat. t. .

Inhabits W. Africa; Senegal and Gambia. Called *Oualofes* or *Zalofes*.

The dark colour of the chest and outside of the limbs, and the high crest of the male, are not developed until they are four or more years old.

This species varies in some having seven and others nine white cross-bands, and some are spotted and others not; but they breed together, and the produce is often a different variety from the parent.

They breed constantly at Knowsley: in May 1845 they had a small herd of two males and four females, three of which were expected to bear young.

4. TRAGELAPHUS DECULA. The DECULA.

Grey brown; back with three or four indistinct cross-bands; an arched streak on upper part of side, a few spots forming an arch on the haunches; dorsal line, streak on nose, and in front of fore-legs blackish.

Antelope Decula, Rüppell, Abyss. t. 4.—*Tragelaphus Decula*, Gray, Knows. Menag. 28.

Var. Back without the cross-bands.

Inhabits Africa; Abyssinia (*Rüppell*).

†† *Back without any cross-bands or lateral streak.*

5. TRAGELAPHUS SYLVATICUS. The BOSCH BOC.

Blackish brown; head pale brown; back, across forehead, black; small spot on haunches, larger spot on insides of legs and on feet white; dorsal line longly crested, black, white varied in. Female paler brown. Young: pale bay.

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Antelope sylvatica, Sparmann, Act. Holm. iii. t. 7.—*Tragelaphus sylvatica*, Harris, W. A. A. t. 26; Gray, Knowsley Menag. 28.—*Forest Antelope*, Pennant.

Inhabits S. Africa; Cape of Good Hope. Brit. Mus.

Var.? Smaller horns, rather more erect.

Antelopus Ronleynei (the *Serolomoot broque*), Ronaleyn; G. Cumming, Hunter's Life S. A. ii. 178, 179.

Inhabits Limpopo.

The two pairs of horns, named by Colonel H. Smith *Boselaphus canna* (*a*, *b*, in the List of Mamm. Brit. Mus. 155); one, presented by Dr. W. Burchell, is certainly the horns of this species, and the other appear to be those of a young male, *Strepsiceros Kudu*.

The ASIATIC STREPSICERES have a bovine nose, with a large coriaceous moist muffle extending over the whole front of the upper lip; small, short, angular horns; a deep longitudinal tear-bag; and the hind-legs much shorter than the fore-ones; the skull without any suborbital pit, and only a minute fissure; and with supplementary lobes to the grinders.

4. PORTAX; *Oreas*, sp. Fischer; *Tragelaphus*, Ogilby; *Damalis* (*Portax*), H. Smith.

Horns short, conical, angular, with an obscure oblique ridge; tear-bag deep, longitudinal; shoulders higher than the rump.

1. PORTAX TRAGOCAMELUS. The NYLGHAU.

Grey; under surface, rhombic spot on the forehead and above the hoofs black and white ringed; tail, end black. Female browner. Young: dull reddish fawn; lower part of fore-legs brighter; under lip, spot on jaws, and line along belly on inside of legs and fore-part of hock, white; tip of tail, line on back of nose and on front of legs black.

Antelope Trago-camelus, Pallas, Misc. 5.—*A. picta*, Pallas, Spicil. xiii. 54; Gray, Cat. B. M.—*A. albipes*, Erxl. 280.—*A. leucopus*, Zimm. Zool. 541.—*Damalis* (*Portax*) *Risia*, H. Smith.—*Portax picta*, Gray, Cat. B. M.—*P. Tragocamelus*, Gray, Knows. Menag. 28. t. 29.—*Tragelaphus Hippelaphus*, Ogilby.—*P. Tragelaphus*, Sundev.—*Biggel*, Mandelst. Reise (1658), p. 122.—*Tragelaphus Caii*, Raii Syn. 82?; Parsons, Phil. Trans. No. 476. p. 465. t. 3. f. 9.—*Nylghau*, Hunter, Phil. Trans. lxi. 170. t. 5.—*Nilghaut*, Buffon, H. N. Supp. v. t. 10, 11; F. Cuv. Mamm. Lithog. t. —*Indostan Antelope*, Penn. Syn. 29.—*White-footed Antelope*, Penn. Syn. 29. t. 6. f. 1, 2.

Inhabits India. The *Roou* of the Mahrattas, the *Nylghau* of the Persians.

This species has bred at Knowsley. In December 1845 they had two calves, both females, making a flock of one male and four females; they are in the paddock with the *Eland* in summer. They have also bred in the Gardens of the Zoological Society (See *P. Z. S.* 1831, 37), and in the Menagerie of Sir Robert Heron at Shibton.

2. A MONOGRAPH OF SCARABUS, A GENUS OF AIR-BREATHING
GASTEROPODOUS MOLLUSCA; FROM SPECIMENS IN THE
CUMINGIAN COLLECTION. BY ARTHUR ADAMS, R.N.,
F.L.S. ETC.

SCARABUS, Montfort.

Testa ovata, spira subobtusa, anfractibus compressis, varice utrinque instructis; apertura ovali intus utrinque dentata; peristomate non continuo, labro simplici, subexpanso.

The *Scarabi* have the eyes sessile on the inner bases of the tentacles, which are short and annulated; they live like most of the other genera of *Auriculidae*, in the damp woods and mangrove marshes. None have been found in the African or American regions, but all the species at present known are from the East Indies.

SCARABUS IMBRIUM, Montfort, Conch. Syst. vol. i.; Férussac, Prodrome, p. 101; Chemnitz, Conch. vol. ix. pl. 136. fig. 1249 & 1250.

Helix scarabæus, Linn.—*Helix pythia*, Müller.—*Bulimus scarabæus*, Bruguière.—*Auricula scarabæus*, Lamarck.

S. testâ ovato-pyramidalî, rufo-fusco variegatâ, longitudinaliter valdè striatâ; spirâ acuminatâ; aperturâ subrotundatâ, spiram æquante; labro posticè inflexo.

Shell ovately pyramidal, variegated with red-brown, longitudinally strongly striated, spire acuminate; aperture subrotundate, as long as the spire; outer lip posteriorly inflexed.

Hab. Island of Bohol, Philippines; in dry woods, under stones, and in earth; *H. C.* (Mus. Cuming.)

The large size, pyramidal form and strongly striated epidermis are peculiar to this species: the upper tooth on the inner lip is more triangular, and the posterior part of the outer lip is more inflexed than in *S. Lessoni*.

SCARABUS LESSONI, Blainville, Dict. Sci. Nat. pl. 48. fig. 32; Lesson, Voy. de la Coquille, vol. ii. p. 334. pl. 10. fig. 4.

Auricula Petiveriana, var. *Deshayes*.

S. testâ ovatâ, longitudinaliter substriatâ, rufo-castaneo variegatâ; spirâ lateribus concavis; aperturâ oblongâ, spirâ longiore; labio subplano, labro posticè arcuato.

Shell ovate, longitudinally substriated, variegated with chestnut-red; spire with the sides convex; inner lip rather flattened, outer lip posteriorly arcuated.

Hab. New Ireland; *Hinds*. (Mus. Cuming.)

The oval form and oblong mouth render this species easily distinguished from *S. imbrium*: the upper tooth on the inner lip is longer, and two of the five teeth in the outer lip are more prominent than the others.

SCARABUS PETIVERIANUS, Férussac, Prodrôme, p. 101 ; Petiver, Gazophylacia Naturæ, pl. 4. fig. 10.

Cochlea Bengalensis, Petiver.—Auricula Peteveriana, Desh.

S. testâ ovato-oblongâ, læviusculâ, longitudinaliter tenuissimè striatâ, albidâ castaneo variegatâ ; aperturâ spiram æquante ; labro arcuato.

Shell ovately oblong, rather smooth, longitudinally very finely striated, whitish, variegated with chestnut-brown ; aperture as long as the spire ; outer lip arcuated.

Hab. Borneo ; Cagayan, province of Misamis ; Mindanao ; in damp woods, under decayed leaves ; *H. C.* (Mus. Cuming.)

This species is characterized by its smaller size, more ovate form, smoother epidermis, the arcuated outer lip, and rotundate aperture.

SCARABUS TRIGONUS, Troschel, Wiegmann's Archiv, 1840.

S. testâ triangulari, rufo-fusco marmoratâ, anfractu ultimo transverso gibbo angulato, aperturâ angustatâ, labro valdè reflexo.

Shell triangular, marbled with red-brown, last whorl transverse, gibbous, angulated ; aperture narrowed ; outer lip greatly reflected.

Hab. Sarsogon ; Luzon ; dense woods, damp places ; *H. C.* (Mus. Cuming.)

The triangular form, approaching that of *Tomogerus*, at once distinguishes this species : the middle tooth on the inner lip is double, the upper tooth prominent : there are five teeth in the outer lip, two being more prominent than the others.

SCARABUS PLICATUS, Férussac, Prodrôme, p. 101 ; Chemn. Conch. vol. ix. pl. 136. fig. 1252, 1253.

Helix scarabæus, var. Chemn.—Auricula plicata, Deshayes.—*Scarabus triangularis, Benson.*

S. testâ subtriangulari, obliquâ, gibbosâ, spirâ brevi, acuminatâ, lateribus concavis, anfractu ultimo posticè gibboso anticè subangulato distorto, epidermide longitudinaliter obliquè striatâ, castaneâ, fasciis pallidis confusè ornatâ ; aperturâ angustâ, labio anticè flexuoso, labro arcuato, anticè valdè dilatatâ, reflexâ, rimâ umbilicali longâ transversâ.

Ashy or chestnut-brown, with pale, rather indistinct bands ; much larger and more triangular than *S. Borneensis*, with the outer lip regularly arcuated.

Hab. India ; *Benson.* Jaffna, in saline marshes ; *Dr. Gardner.* (Mus. Cuming.)

SCARABUS STRIATUS, Reeve, Ann. & Mag. Nat. Hist. 1842, vol. ix. p. 220. fig. 9.

Auricula scarabæus, Quoy, *Voy. de l'Astrolabe*, Zool. vol. ii. p. 162. pl. 13. f. 24.

S. testâ ovato-trigonalî, fusco variegatâ, longitudinaliter valdè striatâ ; spirâ acuminatâ ; labio antico subflexuoso.

Shell ovately trigonal, variegated with brown, longitudinally strongly striated; spire acuminate; inner lip anteriorly subflexuose.

Hab. San Nicholas, island of Zebu; *H. C.* (Mus. Cuming.)

The sharp-pointed spire, striated epidermis and flexuous inner lip, distinguish this form: in the outer lip two of the teeth are more prominent than the others, the intermediate ones being more or less divided or bifid.

SCARABUS CECILLII, Philippi, Zeitsch. für Malacol. 1847, August.

S. testâ ovato-oblongâ, læviusculâ, tenuissimè in longum rugatâ, corned; anfractu ultimo interdum castaneo, superius corneo bifasciato; epidermide lineis obscuris ziczac-formibus, punctisque, marmoratâ.

Shell ovately oblong, rather smooth, longitudinally very finely rugose, horn-coloured, last whorl chestnut-coloured, with two horn-coloured bands superiorly; epidermis ornamented with zigzag reticulated lines and punctures.

Hab. China. (Mus. Cuming.)

The reticulated epidermis, narrow ovoid form, and angulated outer lip are peculiar to this species; the aperture is oblong, equal to the spire; the outer lip below the angle is rectilinear, and but three teeth are visible in the outer lip.

SCARABUS UNDATUS, Lesson, Voy. de la Coquille, Zool. vol. ii. p. 336. pl. 10. f. 6.

Auricula scarabæus, var. Desh.

S. testâ ovatâ, fuscâ, longitudinaliter valdè striatâ; striis undulatis subdecussantibus; anfractu ultimo posticè gibboso; labio arcuato, valdè reflexo.

Shell ovate, fuscous, longitudinally strongly striated; striæ undulated, posteriorly decussating; last whorl posteriorly gibbous; outer lip arcuated, greatly reflected.

Hab. —? (Mus. Cuming.)

The waved elevated lines which cross each other irregularly on the back, and the last whorl posteriorly tumid, will characterize this species: the upper tooth is large and elongated on the inner lip, and the lower tooth of the outer lip is rather lamelliform.

SCARABUS PYRAMIDATUS, Reeve, Ann. & Mag. Nat. Hist. 1842, vol. ix. p. 221. fig. 12.

S. testâ ovato-pyramidalî, pallidâ, aurantio-fusco variegatâ, longitudinaliter substriatâ; aperturâ aureâ, labio circulari.

Shell ovately pyramidal, pallid, variegated with orange-brown, longitudinally somewhat striated; aperture golden orange, outer lip circular.

Hab. New Ireland; *Hinds.* Solomon's Islands; *Capt. d'Orville.* (Mus. Cuming.)

The pyramidal form, golden aperture, and light yellow-brown markings distinguish this species, though some specimens are much more ovate than others: the peritreme is double and thickened, the middle

tooth of the inner lip is simple and thickened, and in the outer lip two of the teeth are large and conspicuous.

SCARABUS CUMINGIANUS, Petit.

S. testâ ovato-trigona, fuscâ, longitudinaliter substriatâ; anfractu ultimo valdè varicoso; aperturâ aeratâ, labio calloso, labro valdè posticè sinuato.

Shell ovately trigonal, brown, longitudinally substriated; last whorl strongly varicose; aperture copper-coloured; inner lip callous, outer lip posteriorly sinuated.

Hab. Boljoon, island of Zebu, Philippines; in earth, among decayed coral in the woods. (Mus. Cuming.)

The upper tooth on the inner lip is thickened with a calcareous deposit; the middle tooth is prominent, with a callosity at the lower part: on the outer lip three of the teeth are very prominent, the others are obsolete; the varix on the last whorl is very prominent; the umbilical fissure is wide and deep.

SCARABUS LEKITHOSTOMA, Reeve, Ann. & Mag. Nat. Hist. 1842, vol. ix. p. 220. fig. 6.

S. testâ oratâ, imperforatâ, solidâ, fusco variegatâ; aperturâ aurantiacâ, labio incrassato, labro duplicato, posticè subsinuato.

Shell ovate, imperforate, solid, variegated with brown; aperture golden orange; inner lip callous, thickened, outer lip double, posteriorly somewhat sinuated.

Hab. —? (Mus. Cuming.)

The middle tooth of the inner lip is double; in the outer lip there are three prominent teeth, the two posterior being approximated; there is no umbilicus, and the spire is concave at the sides; the back, moreover, is strongly plicated near the sutures.

SCARABUS CASTANEUS, Lesson, Voy. de la Coquille, Zool. p. 336. pl. 10. fig. 7.

S. testâ oblongâ, ovato-pyramidalî, læviusculâ, longitudinaliter substriatâ, castaneâ; spirâ elevatâ, acuminatâ; aperturâ oblongâ, spiram æquante, labro semicirculari.

Shell oblong, ovately pyramidal, rather smooth, longitudinally substriated, chestnut-brown; spire elevated, acuminate; aperture oblong, as long as the spire, outer lip semicircular.

Hab. Sibonga, island of Zebu, in the woods; *H. C.* (Mus. Cuming.)

This is a smooth, oblong shell, with a regularly arched outer lip with four teeth within it, two of which are much larger than the others.

SCARABUS POLLEX, Hinds, Zool. Voy. Sulphur, Moll. p. pl. 16. fig. 9, 10.

S. testâ ovatâ, compressâ, fusco-castaneâ, longitrorsum valdè striatâ, anfractu ultimo confusè fuscato.

Shell ovate, compressed, chestnut-brown, longitudinally strongly striated, last whorl indistinctly banded.

Hab. Feejee Islands; *Hinds.* (Mus. Cuming.)

Distinguished from *S. Lessoni* by its coarsely striated surface and different markings; and from *S. castaneus* by its larger size and darker colour, in being more striated, and by two dark yellowish bands on the upper part of the last whorl.

SCARABUS SEMISULCATUS, A. Adams. *S. testâ ovato-pyramidalî, læviusculâ, rufo-castaneâ, longitudinaliter vix striatâ, anfractibus convexiusculis semisulcatis, fasciâ nigricante prope suturam; aperturâ subrotundatâ; labio crasso, anticè rotundatâ, dilatâ; labro semicirculari, posticè subsinuato.*

Shell ovately pyramidal, smooth, reddish dark chestnut colour, longitudinally slightly striated; whorls rather convex, semisulcated, with a blackish band near the sutures; aperture rather round; inner lip thickened, anteriorly rounded and dilated; outer lip semicircular, posteriorly somewhat sinuated.

Hab. — ? (Mus. Cuming.)

A pyramidal, smooth, dark-brown shell, with the whorls strongly sulcated longitudinally near the sutures; two of the teeth in the outer lip are much larger than the others, and the inner lip is rounded and thickened in front; the umbilicus is large and deep.

SCARABUS SINUOSUS, Adams. *S. testâ ovato-oblongâ, flavescenti nigro-fusco maculatâ; epidermide tenuissimè longitudinaliter substriatâ; spirâ obtusâ, lateribus convexis; aperturâ oblongâ; labio anticè rotundato, reflexo; labro posticè valdè sinuoso, in medio inflexo, peritrematè incrassato.*

Shell ovately oblong, yellowish, spotted with blackish brown; epidermis very finely longitudinally substriated; spire obtuse, the sides convex; aperture oblong; inner lip anteriorly rounded, reflexed; outer lip posteriorly strongly sinuated, inflexed in the middle, peritreme thickened.

Hab. Island of Negros, Philippines. (Mus. Cuming.)

The posterior tooth of the inner lip is elongated, the middle tooth double; in the outer lip three of the teeth are prominent, the two posterior being approximated; the umbilicus is partly closed by the reflection of the inner lip.

SCARABUS IMPERFORATUS, A. Adams. *S. testâ ovatâ, compressâ, imperforatâ; spirâ brevi, acuminatâ, lateribus concavis, læviusculâ, longitudinaliter tenuissimè substriatâ, lutescenti fusco-castaneo variegatâ, anfractu ultimo posticè subangulato; aperturâ oblongâ; labio anticè excavato, reflexo, labro semicirculari.*

Shell ovate, compressed, imperforate; spire short, acute, sides concave, rather smooth, longitudinally very finely substriated, yellowish, variegated with light chestnut, last whorl somewhat angulated posteriorly; aperture oblong; inner lip anteriorly flattened, excavated, reflexed; outer lip semicircular, umbilicus closed.

Hab. Borneo. (Mus. Cuming.)

The last whorl is posteriorly gibbous; the umbilicus is closed by the inner lip; three of the teeth in the outer lip are prominent, the two posterior approximated.

SCARABUS PANTHERINUS, A. Adams. *S. testâ ovato-pyramidalî, tenui, læviusculâ, longitudinaliter substriatâ, lutescenti, maculis rufo-fuscis ornatâ; spirâ acuminatâ, lateribus convexis; aperturâ oblongâ, labio anticè rotundato, reflexo, labro semicirculari.*

Shell ovately pyramidal, thin, rather smooth, longitudinally substriated, yellowish, ornamented with red-brown spots; spire acuminate, the sides convex; aperture oblong, inner lip anteriorly rounded and dilated, outer lip semicircular.

Hab. Siquejor; Philippines, woods, under stones. (Mus. Cuming.)

The aperture is yellowish white; three of the teeth in the outer lip are more prominent than the others, the intermediate ones being sometimes double; the umbilicus is large and deep.

SCARABUS BORNEENSIS, A. Adams. *S. testâ ovato-pyramidalî, luteo-fusâ, castaneo confusè fasciatâ, læviusculâ; epidermide tenuissimè, longitudinaliter striatâ; aperturâ oblongâ, angustâ, spiram subæquante, anfractu ultimo infernè subangulato; foveâ umbilicali angustâ, transversâ.*

Shell ovately pyramidal, yellowish brown, obscurely transversely banded, rather smooth, very finely longitudinally striated; aperture oblong, narrow, nearly as long as the spire, last whorl inferiorly subangulated; umbilical fissure narrow, transverse.

Hab. Borneo; *Lieut. Taylor.* (Mus. Cuming.)

This species is narrower and more ovate than *S. plicatus*, of a much smaller size; the outer lip is rectilinear in the middle; the teeth of the outer lip are connected by an elevated ridge, and three of the teeth are more prominent than the others.

SCARABUS CHALCOSTOMUS, A. Adams. *S. testâ ovato-pyramidalî, spirâ elevatâ, acutâ, longitudinaliter substriatâ, pallide luteâ, rufo-fusâ variegatâ; aperturâ ovali, ænè; labio anticè subrecto; labro semicirculari; umbilico patulo.*

Shell ovately pyramidal, spire elevated, sharp, longitudinally substriated, pale yellow varied with reddish brown; aperture oval, brassy; inner lip anteriorly rather straight, outer lip semicircular; umbilicus open.

Hab. Solomon's Islands; *Capt. D'Orville.* (Mus. Cuming.)

In general appearance this species resembles *S. pyramidatus*, but it is more oval, larger, lighter, with the middle tooth on the inner lip double, and the lower tooth broad and ascending; two of the teeth in the outer lip are very large and tubercular.

3. A MONOGRAPH OF PHOS, A GENUS OF GASTEROPODOUS MOLLUSCA. BY ARTHUR ADAMS, F.L.S., R.N.

PHOS, Montfort.

Shell ovately fusiform, spire acuminate, whorls longitudinally ribbed and cancellated; columella with a single anterior plait; outer lip notched in front, striated within. The animal has a small head;

the tentacles connate at the base, with the eyes near their distal third; the foot is dilated in front, forming an elevated shield, acutely auriculate on each side, pointed behind, and ending in a single long filament. Operculum small, horny, and unguiform. In three species of this genus in which I have observed the animal, namely *Phos senticosus*, *roseatus*, and *Blainvillii*, the hind part of the foot terminated in a single median filament, and not, as in *Nassa*, in a bifurcate tail.

1. *PHOS SENTICOSUS*, Linn. sp.; List. Pl. 967. fig. 22.
Buccinum senticosum, Linn.
Phos senticosus, Montfort.
Hab. Philippine Islands; *H. C.*
2. *PHOS BLAINVILLII*, Desh. Chemn. pl. 125. f. 1201, 1202.
 Kienzer, Mon. *Buccinum*, pl. 11. f. 38.
Buccinum pyrostoma, Reeve.
Hab. Philippine Islands; *H. C.*
3. *PHOS CUMINGII*, Reeve, Elements of Conchology, pl. 3. fig. 16.
Hab. —?
4. *PHOS CRASSUS*, Hinds, Zool. Voy. Sulphur, Moll. p. 37. pl. 10. f. 1, 2.
Hab. Panama, Gulf of Fonseca.
5. *PHOS VIRGATUS*, Hinds, *l. c.* p. 37. pl. 10. fig. 11, 12.
Hab. Ceylon.
6. *PHOS RETECOSUS*, Hinds, *l. c.* p. 37. pl. 10. fig. 3, 4.
Hab. Ceylon.
7. *PHOS VERAGUENSIS*, Hinds, *l. c.* p. 37. pl. 10. fig. 13, 14.
Hab. Pueblo Nueva, west coast of Veragua.
8. *PHOS ARTICULATUS*, Hinds, *l. c.* p. 38. pl. 10. fig. 7, 8.
Hab. Panama.
9. *PHOS ROSEATUS*, Hinds, *l. c.* p. 38. pl. 10. fig. 9, 10.
Hab. North coast of Sumatra.
10. *PHOS GAUDENS*, Hinds, *l. c.* p. 38. pl. 10. fig. 5, 6.
Hab. Gulf of Tehuantepec, west coast of Mexico.
11. *PHOS CANCELLATUS*, A. Adams. *P. testâ ovato-fusiformi, albidd, obsoletè fusco fasciatâ; anfractibus subrotundatis, lineis elevatis longitudinalibus et transversis, valdè cancellatis, cancellis ad angulos acutè nodosis; aperturâ intus fuscâ, anticè tuberculatâ, plicâ validâ.*
Hab. —?

This species resembles *P. veraguensis*; but the areas between the cancelli are simple, whereas in *P. veraguensis* there is an intermediate, elevated line, crossing them, a circumstance not mentioned in the description of Mr. Hinds.

12. PHOS TURRITUS, A. Adams. *P. testá ovato-fusiforimi, tenui, subpellucidá, spirá turrítá, acuminatá, albido-fuscatá; anfractibus rotundatis, costis longitudinalibus angustis numerosis, lineis elevatis, transversis, ad costas nodulosis, ornatis; columellá plicá anticá subevanidá.*

Hab. Panama, coral sand, 6 to 10 fathoms; *H. C.*

13. PHOS TEXTILIS, A. Adams. *P. testá elongatè ovatá, albidá, spirá acutá, costis rotundatis, crassis, infra suturam nodoso-angulatis, lineis transversis, planis, subconfertis, elevatis, interstitiis longitudinaliter subtilissimè striatis; columellá plicá anticá validá.*

Hab. Dumaguete, Philippines; *H. C.*

In general form this species approximates *P. Blainvillii*, but the elaborate and distinct style of sculpture and white aperture at once distinguish it.

14. PHOS RUFOCINCTUS, A. Adams. *P. testá ovato-fusiforimi; spirá productá, angustá, albidá, fasciá rufá ornatá; anfractibus rotundatis, costis crassis, infra suturam rotundatis, lineis transversis, elevatis, nodulosis, confertis, ornatis; columellá plicá anticá productá.*

Hab. Dumaguete; *H. C.*

The nucleus of this species is large and papillary.

15. PHOS SCALARIOIDES, A. Adams. *P. testá ovatá, acuminatá, turrítá, albidá, fusco variegatá, obscurè fusco bifasciatá; anfractibus rotundatis, costis longitudinalibus, distantibus, infra suturam rotundatis, lineis elevatis, transversis, ad suturas nodulosis, interstitiis subtilissimè longitudinaliter striatis; columellá supernè callosá, infernè plicá productá; labro intus lirato.*

Hab. — ?

A beautiful species, with regular, strong ribs, giving it the appearance of a *Scalaria*.

16. PHOS SPINICOSTATUS, A. Adams. *P. testá ovatá, spirá acuminatá, albidá, sparsim fusco nebulosá; anfractibus rotundatis, costatis, costis distinctis, subdistantibus, infra suturam angulatis et spinosis, lineis transversis elevatis ornatis; columellá rufo-fusco maculatá, plicá anticá productá; labro intus rufescenti lirato.*

Hab. Batangas, in insulis Philippinis.

17. PHOS NODICOSTATUS, A. Adams. *P. testá ovatá, turrítá, acuminatá, albidá, rufo-fusco maculatá; anfractibus rotundatis, costatis, costis distantibus, infra suturam angulatis et nodosis, lineis transversis, elevatis, ad costas nodulosis ornatis; columellá plicis evanidis, plicá anticá validá productá.*

Hab. ad insulam Negros; *H. C.*

The two species, described above, are somewhat similar in form,

but the peculiarity of the ribs and colour of the apertures readily distinguish them.

18. PHOS CYLLENOIDES, A. Adams. *P. testâ oratâ, albido-fusca, spirâ acutâ, longitudinaliter plicato-costatâ, costis superne nodosis, ad suturam evanidis, lineis impressis transversis sulcatâ; columellâ plicâ anticâ, valde productâ; labro intus fusco lirato.*

Hab. in insulis Philippinis.

19. PHOS CYANOSTOMA, A. Adams. *P. testâ elongatè oratâ, acuminatâ, albidâ, anfractibus rotundatis, costatis, costis crassis, æqualibus, infra suturam plicato-nodosis, cingulis elevatis, transversis, subdistantibus, interstitiis longitudinaliter subtilissimè striatis; aperturâ cyaneo tinctâ; columellâ tuberculatâ, plicâ anticâ validâ.*

Hab. in insulis Philippinis.

The interstices between the transverse ridges in this species are very beautifully engraved with fine longitudinal lines, and the aperture is tinged with blue.

20. PHOS LÆVIGATUS, A. Adams. *P. testâ elongatè oratâ, lævigatâ, pallide fusca; anfractibus subrotundatis, costatis, costis crassis, distantibus, lævigatis, infra suturam valde nodosis, lineis tenuibus transversis ornatis; columellâ plicâ anticâ productâ; labro extus plicato, plicis numerosis confertis, intus substriato.*

Hab. Promontorium Bonæ Spei.

A large, smooth shell, with thick, simple ribs.

June 25, 1850.

William Yarrell, Esq., Vice-President, in the Chair.

The following papers were read :—

1. CATALOGUE OF THE MAMMALIA OF CEYLON. COLLECTED AND OBSERVED BY E. F. KELAART, M.D., F.L.S.

Order PRIMATES.

Fam. SIMIADÆ.

1. Presbytes cephalopterus, *Gray*. The Nestor or Purple-faced Monkey.
2. Presbytes Thersites, *Blyth*. The Wanderoo of Ceylon.
3. Presbytes Priamus, *Elliot*. The larger Wanderoo.
4. Simia sinicus, *Desm*. The Rillouwah or Green Monkey.

There is another Monkey found in Newera Ellia and its neighbourhood, resembling the *P. Priamus*. The *Simia Silenus* is not a native of Ceylon; it comes from the Malabar coast.

Fam. LEMURIDÆ.

5. *Loris gracilis*, Geoff. The Loris or Ceylon Sloth.

The *Loris tardigradus* is said to be also found in the island, but I have not yet seen it.

Fam. VESPERTILIONIDÆ.

6. *Kerivoula picta*, Gray. Painted Kerivoula.
 7. *Pteropus Edwardsii*, Geoff. The Flying Fox.
 8. *Cynopterus marginatus*, F. Cuv. The Cynoptere (margin-eared).
 9. *Vespertilio pipistrellus*, Gm. var. The Pipistrelle.

There are two other Bats in the island which Mr. Edgar Layard has seen and identified.

Order FERÆ.

Fam. FELIDÆ.

10. *Leopardus varius*, Gray. The Leopard (Cheetah of Ceylon).
 11. And var. black, *Felis Melas*, Peron.
 12. *Leopardus viverrinus*, Gray. Var. of the Wagati Cat. The Jungle Cat of Ceylon.
 13. *Felis Chaus*? The Lynx-like Cat.
 14. *Felis domestica*. The domestic Cat (several varieties).
 15. *Viverra indica*, Geoff. The Indian Genette.
 16. *Herpestes griseus*, Sykes. The Grisled-brown Mungous.
 17. *Herpestes vitticollis*, Elliot. The Streaked-neck Mungous.
 18. *Paradoxurus zeylanicus*. Two varieties of the Ceylon Paradoxure.
 19. *Canis aureus*, Linn. Two varieties of the Jackal.
 20. *Canis familiaris*, var. Pariah. The Pariah Dog.
 21. *Lutra nair*, Sykes. The Otter.

I have heard it stated that the Bengal Tiger (*Felis Tigris*) was seen some years ago in Newera Ellia and in the Jaffna district.

I have an imperfect skin of an animal killed at Newera Ellia resembling much that of a *Prionodon*.

Fam. URSIDÆ.

22. *Ursus labiatus*, Blainv. The Indian (lipped) Bear.

Fam. TALPIDÆ.

23. *Sorex murinus*, Linn. The Musk Shrew.
 24. *Corsira Newera Ellia*, Nobis. The Black Shrew.
 Corsira nigrescens, var. or new species.
 25, 26. *Erinaceus*, two species. The Hedgehog.

Order CETE.

27. *Halicore Dugong*, *F. Cuv.* The Dugong.
 28. *Delphinus*, *Sp.* The Dolphin.

The Porpoise and the Whale are also sometimes seen on the coast of Ceylon.

Order GLIRES.

Fam. MURIDÆ.

29. *Mus bandicota*, *Gray.* The Bandicot or Pig Rat.
 30. *Mus decumanus*, *Pallas.* The Norway Rat.
 31. *Mus niviventer*, *Hodgs.?* The White-bellied Rat.
 32. *Mus musculus*, *Linn.* var. The common Mouse, two varieties.
 33. *Leggada booduga*. The Booduga (Soil Rat).
 34. *Golunda newera*, *Nobis.* The Golunda (Soil Rat).

Fam. HYSTRICIDÆ.

35. *Hystrix leucurus*, *Sykes.* The Indian Porcupine.
 36. *Cavia Cobaya*. The domesticated Guinea Pig.

Fam. LEPORIDÆ.

37. *Lepus macrotus?*, *Hodgson.* The Indian or Ceylon low country Hare.
 38. *Lepus nigricollis*, *F. Cuv.* The highland Black-naped Hare.
 39. *Lepus cuniculus*, *Linn.* The tame Rabbit.

Fam. JERBOIDÆ.

40. *Pteromys nitidus*, *Geoff.* The Flying Squirrel.
 41. *Sciurus macrurus*, *Forster.* The Rokea, two varieties.
 42. *Sciurus palmarum*, *Linn.* The Palm Squirrel.
 43. *Sciurus trilineatus?* The Three-streaked Squirrel.

There are three other species of Squirrels in the island, and another flying Squirrel, the skin of which I possess without its head.

Order UNGULATA.

Fam. BOVIDÆ.

44. *Bos taurus*, var. *Indicus.* The Ox.
 45. *Bubalus Buffelus*, *Gray.* The Buffalo (wild and domesticated).
 46. *Ovis Aries*, var. The Jaffna Sheep.
 47. *Capra hircus*, var. The Ceylon Goat.
 The *Bos gaurus* was once seen on the island.
 48. *Meminna indica*, *Gray.* The Meminna.
 49. *Muntjac vaginalis*, *Gray.* The Muntjac.
 50. *Axis maculata*, *Gray.* The Spotted Axis.
 51. *Cervus unicolor*, *H. Smith.* The Ceylon Rusa or Stag.
 52. *Cervus porcinus?*, *Auct.* The Hog Deer.

Fam. EQUIDÆ.

53. *Equus caballus*, Linn. The Horse. Introduced.

54. *Equus asinus*, Linn. The Ass. Introduced.

Mules are also bred in the island.

Fam. EQUIDÆ.

55. *Elephas indicus*, Linn. The Asiatic Elephant.

56. *Sus indicus*, Gray. The Indian Wild Boar.

57. *Sus scrofa*, var. *sinensis*. The domesticated Hog.

Fam. DASYPIDÆ.

58. *Manis pentadactyla*, Linn. The Pangolin, or scaly Ant-eater.

REMARKS.—The new species indicated in the foregoing Catalogue may be described as follows :—

34. *GOLUNDA NEWERA*, *Nobis*.

Fur soft, yellowish brown varied with black; chin and beneath yellowish grey; under-fur dark lead-colour; soft long hairs on the upper parts of the head and body, with longer black-tipped hairs having a subterminal yellowish band; fur of belly dark lead-colour tipped with yellowish grey; ears large, hairy on both sides, of a light rusty or ashy colour; whiskers slender, moderately long, some greyish, others blackish; tail shorter than the body, tapering to a point, scaly; upper surface of a black colour and covered with short semi-adpressed black hair; lower surface yellow or ashy colour, covered with short hair of the same yellow colour; feet having dark brown claws, purplish; four toes to the fore-feet, with a clawless rudimentary thumb; five hind-toes, three middle subequal; soles nearly bald, blackish; palma studded with four small tubercles; planta with six tubercles, the two foremost considerably larger; incisors yellow, superior ones grooved in the centre; molars flat, deeply 3-lobed, tubercles rising in three distinct lines, middle larger than those of the sides, and the front one extending beyond the two other lobes.

Length of body and head, $3\frac{1}{4}$ inches; tail, $2\frac{1}{2}$.

This rat is found in the black soil of Newera Ellia, and is a great destroyer of peas and potatoes. The only two specimens I had, lived for some days in a cage and played like mice.

24. *CORSIRA NEWERA ELLIA*, *Nobis*. (Or variety of *Corsira nigrescens*.)

Slaty or ashy black, very slightly washed with rufous on the upper parts; no trace of rufous beneath, which is paler slaty; whiskers long, very thin, greyish; legs from half way down the thighs covered with short adpressed hairs; feet fleshy grey; hair on the toes longer, and those of the hind-feet extending over the claws; claws white, those of the front feet elongated, compressed, acute; toes 5-5, all clawed;

ears large, naked, partially hid in the fur ; tail black, round, tapering, rather scaly, and thinly covered with short hair intermixed with much longer, glossy, shining, thin, stiff hairs, some of which are also seen in the upper parts and sides of the lower half of the body ; teeth white throughout.

Length of body and head, $3\frac{1}{2}$ inches ; tail, $2\frac{1}{2}$.

Found in Newera Ellia and even on Pedrotellgala, the highest mountain in Ceylon, which rises from the plains of Newera Ellia, and is 8020 feet above the sea's level. I had one quite docile in a box for some days, which fed ravenously on earth-worms ; it used to run about the table and on my arms without attempting to get away ; it died one frosty night.

This shrew differs from the *Sorex murinus* chiefly in the absence of all unpleasant smell. I could not trace any glands or lactæ in any part of the body. The elongated fore-claws is another good specific distinction. The *Sorex murinus* is also found here, and I am inclined to think that a very diminutive shrew, of which I have seen only one specimen, is another species, but which for the present I have considered as only the young of the above-described animal. It resembles in every point the *Sorex pygmæus* of Hodgson (Mag. Nat. Hist. vol. xv.). There are several characters in our *Corsira* which make me consider it not identical with the *C. nigrescens* of Gray, especially the greater length of its tail than in the animal found on the continent of India, which I know only from Mr. Gray's description.

Of the Mammals enumerated in the catalogue, the following are found in Newera Ellia :—*Presbytes priamus*, var. ; *Vespertilio pipistrellus*, var. ; *Felis varius* ; *Felis chaus* ? ; *Herpestes vitticollis* ; *Viverra indica* ; *Paradoxurus* (two var. or species) ; *Canis aureus* ; *Mus Bandicota* ; *Mus musculus* (variety with white feet) ; *Mus albiventer* ; *Golunda Newera* ; *Sorex murinus* ; *Corsira Newera Ellia* ; *Lepus nigricollis* ; *Sciurus macrurus* (very black-coloured variety) ; *S. trilineatus* ? *Elephas indicus* ; *Lutra nair* (perhaps another species, for I only saw it taking the water). The *L. nair* is found in abundance in the low country ; and a *Prionodon*, the skin resembling one I have.

Of Birds, the following I have here, besides those I have enumerated as new : *Cissa puella*, Blyth ; *Caprimulgus indicus*, Latham ; *Palæornis Layardii*, Blyth ; *Hirundo domicola* ; *Acanthylis caudata* ? ; *Collocalia nidifica* ? ; *Gracula ptilogenys* ; *Columba Elphinstonii*, var. ; *Parus cinereus* ; *Gallus Stanleyii* or *Lafayettei* ; *Galloperdix bicalcaratus* ; *Picus ceylonicus* ; *Dendrophila frontalis* ; *Hypsiptes nilgherriensis* ; *Hemipus picatus* ; *Corydala rufa* ; and a few others.

Newera Ellia, Ceylon, 8th May, 1850.

2. ON THE BLOOD-COLOURED EXUDATION FROM THE SKIN OF
THE HIPPOPOTAMUS. BY JOHN TOMES, F.R.S., SURGEON-
DENTIST TO THE MIDDLESEX HOSPITAL.

(Mammalia, Pl. XXI.)

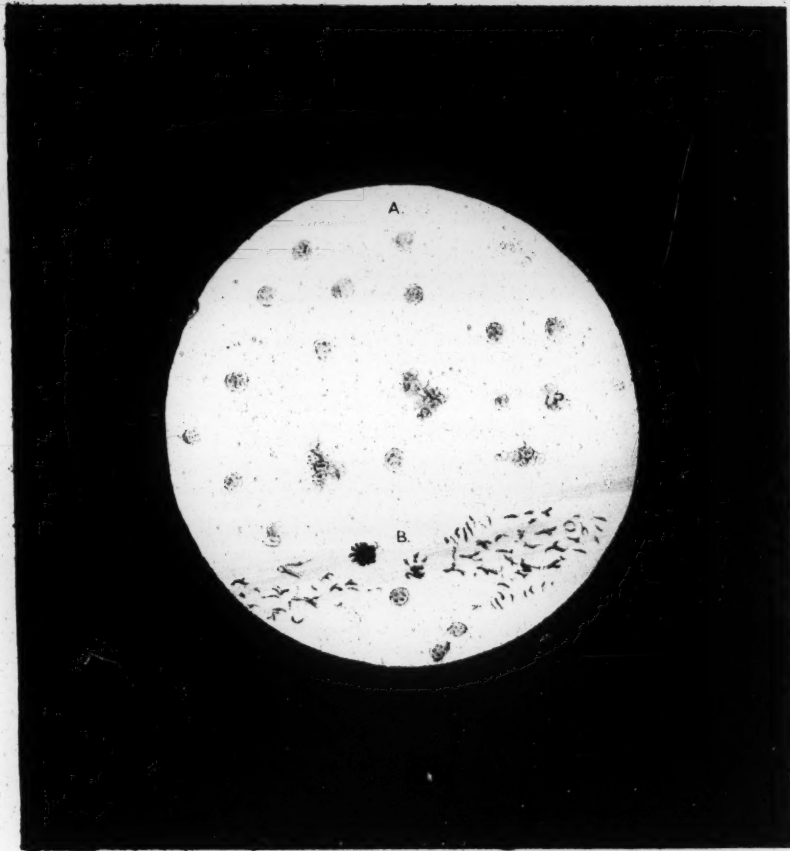
The Honourable C. A. Murray, in a letter which he addressed from his residence at Cairo to Mr. Mitchell, states that the skin of the young Hippopotamus entrusted to his care was at times covered with a blood-coloured exudation, and that it was most abundant immediately after the animal had left his bath. At first this peculiar condition excited considerable alarm, but its constant recurrence, and the otherwise perfectly healthy appearance of the animal, induced the belief that the secretion was normal, or at all events portended no harm. In a letter received at a later date than the one I have referred to, Mr. Murray says that the exudation, though still preserving the same peculiar characters, has diminished both in amount and in intensity of colour.

On the day after the Hippopotamus arrived in the Zoological Gardens, I had a favourable opportunity of examining the general appearance of the skin. The upper surface of the body is dotted over with a number of deep brown spots, disposed on a comparatively faint brownish black ground. The spots are much more apparent when the skin is wet, than when it has become dry from exposure to the air. Immediately after leaving the bath, each of the deep brown spots may be seen to have a slightly raised centre, from which is poured a drop of pink fluid of the consistence of white of egg. This peculiar exudation speedily diffuses itself over the surface of the skin, and dries with a slightly glazed surface.

The Arab keeper who attended the Hippopotamus in his passage to this country, and who still has charge of him, says that he has never seen the red fluid exude, excepting immediately after the animal has left his bath; that it quickly dries up, and does not reappear till the animal again emerges from his bath. The end of the nose is however constantly a little damp, from the presence of a small quantity of a colourless mucous fluid, which escapes from minute pores situated in this part. At the line of junction with the skin and the smooth semi-mucous membrane which covers the extremity of the nose, the fluid has a faint pink colour.

On the second day of the animal's residence in the Gardens, I collected a small portion of the coloured fluid from the middle part of the back, and after securing it between two slips of glass, placed it in the field of my microscope, which I had conveyed there for the purpose of making an examination previous to the fluid undergoing any change, either from decomposition or evaporation, which a slight lapse of time might possibly have affected.

The following particulars were obtained from the examination I then made:—The exudation is composed of a transparent fluid in which float two kinds of corpuscles; one kind is tolerably abundant, and is both transparent and colourless; the other is comparatively rare and of a bright red colour. To the solution of these latter bodies the fluid owes its peculiar colour.



W. Wieg. del. et lith.

Reid & West. Lithographers 54. Norton Glasgow

Exudation from the skin of the
HIPPOPOTAMUS.
A Colourless Globules B Coloured Globules

The colourless corpuscles are spherical in shape, and vary in diameter from the 3450th to the 2100th of an inch; the majority however measure about the 3000th of an inch. Their structure is granular, and in about the same degree as the colourless corpuscles of blood, and the ordinary exudation corpuscles, to which they present a strong resemblance.

Many of these bodies preserve their figure for a considerable time, while others become collected into clusters and form irregular broken masses.

The coloured corpuscles are irregular in size and shape, and are composed of an aggregation of minute elongated and sometimes triradiate bodies, many of which appear, from their irregular and obscure outline, as though partially dissolved. In the immediate neighbourhood of these, the fluid has a much deeper colour than elsewhere. From these circumstances I have been led to conclude that the general pink colour of the fluid is due to the solution of the coloured particles, and not simply to their presence. In this particular the fluid under consideration is strikingly different from blood, which owes its colour to the presence of coloured globules and not to their solution.

The colourless corpuscles are represented in the figure at A, and the coloured ones at B, together with the deeper colour of the fluid at the part in which the latter are present.

These observations were made May 28th, 1850. Since that time I have on several occasions sought to obtain a little more of the red exudation, but always without success. The creature on leaving the bath feels slimy, and a small quantity of transparent tenacious fluid issues from the elevations on the skin, but it quickly dries up.

On Sunday last, June 23, the nose was covered with colourless exudation, and near the upper margin of the nostril it had a perceptible pink tinge. On this occasion the animal had been out of the bath for some hours, and the skin of the body was perfectly dry.

Whether the red colour of the exudation is a condition of youth, and of an imperfect condition of the skin, and has ceased in consequence of the increased age of the animal and the consequent more perfect development of the integument, or has ceased in consequence of the change of climate to which the animal has been lately subjected, is a question which, with the facts at present at our disposal, cannot be satisfactorily determined.

We have however sufficient evidence to warrant the conclusion, that the thick tenacious exudation, whether coloured or otherwise, is poured out only during the time the skin is immersed in water, and that it has an especial reference to the aquatic habits of the animal. It appears for the time to convert the surface of the body into a mucous membrane, and then, on the animal leaving the water, to furnish by its inspissation an epidermis.

Should further inquiry show that the thickness of the exudation arises from a solution of the colourless globules, its relation to mucus will be still further established, and a microscopic examination into

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the structure of the skin will become a subject of great physiological interest.

3. ON SIX NEW SPECIES OF HUMMING BIRDS. By JOHN GOULD, F.R.S. ETC.

Although the Trochilidæ have lately received much attention both from our own and the continental naturalists, the subject is far from exhausted, as is shown by the circumstance of my being able to bring before the notice of the Society this evening no less than six species hitherto uncharacterized and unknown. These great accessions to the family are all from a state with which we have as yet had but little intercourse—that of Veragua in Central America; and we are indebted for a knowledge of them to the researches of an enterprising traveller and botanist, M. Warzewicz, who has just returned from that country, where he successfully explored many forests and other districts not previously trodden by the foot of civilized man. Unfortunately, both for myself and for science, he was not able, in consequence of the heavy rains which prevailed at the time, to procure or to preserve the examples in so fine a state as could be wished; although much mutilated and otherwise damaged, they are, however, sufficiently perfect to admit of my furnishing the following descriptions:—

1. TROCHILUS (SELOSPHORUS) SCINTILLA.

Male: upper surface bronzy green; on the throat a gorget of glittering fiery red, the feathers of which are much produced on either side; beneath the gorget a band of buffy white; wings purple-brown; central tail-feathers brownish black, margined with rusty red; lateral tail-feathers brownish black on their outer and rusty red on their inner webs; under surface reddish brown; bill black.

Female: upper surface as in the male, but not so bright; under surface white; throat-feathers less produced, and spotted with brown on a white ground; flanks buff; tail rufous, crossed by a crescentic bar of black near the tip.

Total length of the male, $2\frac{3}{4}$ inches; bill, $\frac{1}{2}$; wing, $1\frac{1}{4}$; tail, 1.

Hab. Volcano of Chiriqui, at an altitude near 9000 feet.

This is an extremely beautiful species, and forms a miniature representative of the *Trochilus rufus*, to which it is somewhat allied.

2. TROCHILUS (THAUMATIAS?) CHIONURA.

Male: upper surface very dark grass-green; wings purplish brown; central tail-feathers bronzy green; lateral tail-feathers white, largely tipped with black; throat pale shining green; flanks greenish; centre of the abdomen and under tail-coverts white; upper mandible black, base of the lower mandible fleshy white.

Female: upper surface as in the male, but paler; lateral tail-feathers white, as in the male, but crossed near the extremity with an oblique band, instead of being tipped with black; throat and under surface generally white.

Total length, $3\frac{1}{2}$ inches; bill, $\frac{5}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{4}$.

Hab. Chiriqui near David, province of Veragua, at an altitude of from 2000 to 3000 feet.

This is a remarkable species, differing, as it does, from all other Humming-Birds with which I am acquainted, in the large amount of white on the tail-feathers, which shows very conspicuously when that organ is spread. In form it is very similar to the *T. brevirostris* and *T. longirostris* of the Brazils.

3. TROCHILUS (THALURANIA) VENUSTA.

The entire crown, back of the neck, and upper part of the back, shoulders, abdomen, and under tail-coverts, beautiful shining ultramarine blue; throat and fore-part of the neck rich metallic green; wings purplish black; tail considerably forked, and of a blackish blue; bill black.

Total length, 4 inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{3}{4}$.

Hab. Volcano of Chiriqui in Veragua.

Remark.—Nearly allied to, and of the same form and size as, the *T. furcatus*, but a far finer bird.

4. TROCHILUS (—?) CÆRULEOGULARIS.

Male: upper surface, shoulders, abdomen and under tail-coverts, shining grass-green; throat, sides of the neck and chest, rich violet-blue; wings purple-brown; tail rather forked; central feathers bronzy green; lateral feathers purplish black; upper mandible and tip of the lower black; basal portion of the latter fleshy white.

Female: upper surface shining grass-green, but of a paler hue than in the male; tail as in the opposite sex, except that the lateral feathers are tipped with white; centre of the throat, abdomen and under tail-coverts white.

Total length, $3\frac{3}{4}$ inches; bill, $\frac{3}{4}$; wing, 2; tail, $1\frac{1}{2}$.

Hab. Near David, on the north side of the Cordillera, Veragua.

I am also indebted to Dr. T. B. Wilson of Philadelphia for the loan of a specimen from Panama. This species is precisely of the same elegant form as the *T. Goudotii*, but is of a larger size, and is at once distinguished from that bird by its blue breast.

5. TROCHILUS (—?) CASTANEOVENTRIS.

Crown of the head metallic green; upper surface green; wings purplish brown; tail dark bronzy green, crossed near the tip by a broad band of black; the lateral feathers tipped with buff, which decreases in extent as the feathers approach the central ones; all the under surface reddish chestnut; bill black.

Total length, 4 inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{4}$; tail, $1\frac{3}{8}$.

Hab. Cordillera of Chiriqui, at an altitude of 6000 feet.

Remark.—This is a moderately sized species, and is not allied to any other member of the family with which I am acquainted; I am therefore unable to assign it a place in any of the sections hitherto proposed; the specimens I possess appear to be immature, and are unfortunately in bad condition.

6. *TROCHILUS* (—?) *NIVEOVENTER*.

Crown of the head and back of the neck bronzy green; back rich coppery bronze; wings purple-brown; upper tail-coverts reddish purple; tail purple-black; throat resplendent green; abdomen snow-white; flanks green; under tail-coverts greenish brown, margined with white; bill black, except the basal three-fourths of the lower mandible, which are flesh colour.

Total length, $3\frac{3}{4}$ inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{4}$.

Hab. Near David; warm countries of Veragua.

Remark.—Nearly allied to *T. Edwardi* and *T. erythronotus*; from the former, however, it differs in the colour of the tail, and from the latter in the white colouring of the breast.

July 9, 1850.

John Gould, Esq., F.R.S., in the Chair.

The following papers were read:—

1. ON THE GENERIC SUBDIVISION OF THE BOVIDÆ, OR HOLLOW-HORNED RUMINANTS. BY H. N. TURNER, JUN.

In the series of observations upon the Ungulate Mammalia, of which I attempted last winter to lay before the Society the more general results, my attention was also in some measure directed towards the detailed arrangement of those portions of the order which have generally proved subjects of difficulty. Of these, the classification of the *Bovidæ*, or hollow-horned Ruminants, has certainly been the greatest, since they form a well-marked natural group, including a great variety of forms, with but few remarkable differences of structure. I soon found, however, that even setting aside some of the more strikingly-modified genera, the distinctions afforded by the skull were much more decided than any that I could find among the *Cervidæ*, which, from their being less rich in number and variety, were always easier to subdivide correctly. Not having been able at that time to observe the skulls of certain of the more remarkable forms, I set the matter aside for better opportunities; and now that the large and interesting collection of hunters' spoils which Mr. Roualeyn Gordon Cumming has brought together, and is at present exhibiting in London, has given me the opportunity of supplying some of these desiderata, I venture, although there are yet a few points I could wish to ascertain, to lay this portion of my researches before the Society.

There cannot be a doubt that the horns present the best and most readily discernible characters, or that, when the genera are once correctly determined, they may be pretty easily defined by the variations of these parts alone; but it has long since been seen how the con-

sideration only of the horns has led to very unnatural approximations. For example, Cuvier associates the Addax with the Indian Antelope; and Mr. Blyth, his translator, inserts his belief that it is more allied to the Coudou, which I think modern naturalists will allow to be equally wide of the truth. Again, the species forming the genera *Ægocerus* and *Nemorhædus* of Major Smith are placed together in the 'Règne Animal,' and Mr. Blyth hints that the Anoa may be allied to the Oryx.

It is certainly remarkable, that while the teeth have contributed so important a share in the characters by which the mammalia have been arranged by various authors, they should have been so entirely overlooked in the members of the present division; for notwithstanding the great uniformity and strongly-marked character pervading the Ruminant dentition, very decided characters may frequently be found in the form and direction of the incisors, and in the presence or absence of the supplemental lobe in the molars; and it is the more to be wondered at when we consider that the incisors, from their position, may often easily be seen in dried specimens, and that the character alluded to in the molars has been found of considerable value in the interpretation of fossil remains. The remaining characters I shall have to bring forward consist of certain little details of structure in the skull, which are very easy to be perceived, and which, as I have found them constant in those groups which I have characterized by their means, I trust may meet with due consideration from naturalists.

Of late years, while some zoologists have remained content to call all hollow-horned Ruminants that are neither oxen, sheep, nor goats, by the generic name *Antelope*, another class have run into the extreme of the modern fashion by using every trifling external difference visible in dried skins, or recorded in books (sometimes not even excepting size and colour), to divide them so extensively, that the characters of the genera become more difficult to remember than those of the species. Considering the difficulty of observing many of these characters in dry specimens, and of bearing such trivial details in the memory, it is not to be wondered at that many errors of observation have crept in, a few of which I will point out as I proceed, limiting myself in my own diagnoses to the characters of the skull and horns. There is no doubt that the suborbital sinus, improperly called "lacrimal sinus" (translated into "tear-pit" by some authors, "tear-bag" by Mr. Gray), will form a valuable means of distinction when its structure in all the genera has been sufficiently observed upon fresh individuals, or on the parts preserved in fluid, provided that we do not attach too much importance to its relative dimensions; but although its dried appearance may assist discrimination, we cannot venture to describe it. As to inguinal pores and interdigital pits, it must always be difficult, and frequently impossible to determine their presence or absence in specimens that are dried and mounted. Tufts upon the joints of the limbs, and the extent of bare space upon the muzzle, are certainly much too trivial to warrant generic distinction, and never mark out any particular natural group.

The last attempt to arrange this extensive family in subordinate groups is that of Mr. Gray, published in the eighteenth volume of the 'Annals and Magazine of Natural History.' His preliminary remarks, though brief, appear to me quite sufficient to dispose of the arrangements previously set forth, therefore I will content myself with the consideration of his own. The two primary divisions, which are founded only upon the horns, certainly do not indicate any very natural affinities, since, taking the whole structure into consideration, the *Antilopeæ* of Mr. Gray are not more closely allied to the *Bovæ* than they are to the members of the second primary division, nor do the *Strepsiceræ* ally themselves particularly to the Sheep and Goats. With regard to the subdivision of the *Antilopeæ*, he is certainly right in separating the "Antelopes of the Desert" as a group, although there is no doubt that some of the divisions of the "Antelopes of the Fields" are equally as distinct from each other as they are from the former. The division of the latter group into "True Antelopes," "Caprine Antelopes," and "Cervine Antelopes," also possesses some merit; but the genera *Capricornis* and *Nemorhædus* are very distinct from the other Caprine Antelopes, and the genus *Eleotragus* (*Redunca* of Major Smith) is very distinct from the other true Antelopes, and ought, as I am quite convinced, to include the genus *Kolus* of Dr. Andrew Smith, placed by Mr. Gray among his Cervine Antelopes, and consisting of species not known at the time Major Smith was engaged in these researches.

It will be universally admitted, that for the generic division of the Ruminants, zoology is most indebted to Major Smith, and in the course of my observations I have found reason to reject but few of the divisions proposed by him as subgenera, and few, if any, in my opinion, need be added. As I thus propose to curtail the list of genera adopted by Mr. Gray, and to separate certain of them from those with which he has associated them, several will stand alone; and of those which do ally themselves together, no group seems to manifest that particular relationship with other groups which should warrant us in separating the family, as Mr. Gray has done, into divisions of a primary, secondary, tertiary, and in some cases even a fourth and fifth degree of rank.

I will, therefore, while enumerating the characters which I have observed in the genera I propose to adopt, point out which of them appear to constitute groups, and mention those species which, from the inspection of entire specimens, skulls, or at least horns, I feel warranted in referring to the genera under which I place them. As I have seen nothing to guide me to a particular linear arrangement, any naturalist who may be pleased to adopt my divisions is at liberty to place the groups, and the genera contained in each, in whatever order he may think most convenient.

I will first proceed to the "true Antelopes" of Mr. Gray, excluding the genus *Eleotragus*. They all have the horns round, the middle incisors expanded at their summits, the others being bent outwards to make room for them, and the molars without supplemental lobes. The infraorbital depression when existing upon the skull is gene-

rally suddenly pressed in before the orbit. The genera are as follows :—

ANTILOPE.

No suborbital fissure nor fossa*, but a wide opening on the side of the muzzle, between the maxillary and intermaxillary bones; the masseteric ridge rising before the orbit; the auditory bulla large and prominent, with only a small groove on its outer side to receive the attachment of the stylohyal bone; the occiput broad, somewhat produced downwards; its basal portion with the posterior pair of tubercles broad, the anterior ones small. Molars without the supplemental lobe.

Horns annulated, curving outward from the base, then bending backwards and towards the tip upwards.

Hab. South Africa.

A. Melampus.—Of this single species, to which modern zoologists have confined the old generic name, I have only seen skulls of the male, in Mr. Cumming's collection: the lower jaw, as in most of his skulls of Ruminants, being wanting in all of them, I could not ascertain the character of the incisive teeth.

Major Smith assigns a suborbital sinus to this genus, making the principal distinction from the next to consist in the absence of horns in the female, thus associating with it the *gutturosa* and *colus*, belonging properly to the next genus,—the *cervicapra*, which it seems most convenient to separate,—and the *adenota*, which I must now refer to the genus *Eleotragus*. With his *A. forfex* I am at present unacquainted. *Melampus* alone remains, to which Mr. Gray rightly assigns no "tear-bag;" this, together with the horns, must be the external character of the genus, if, indeed, it be essentially distinct from the Gazelles, for the horns might be considered as a distorted modification of the lyrate type, and some species of that genus seem to want the suborbital sinus.

GAZELLA.

A suborbital fissure, and a moderate, or very slight fossa, suddenly pressed in before the orbit; the masseteric ridge rising before the orbit; the auditory bulla large and prominent; the basioccipital bone having its tubercles moderately or but little developed; the median incisors expanded at their summits; the molars without supplemental lobes.

Horns annulated, more or less resembling an inverted lyre; that is, bending a little outwards soon after their origin, and again inwards towards the tip.

Hab. Eastern Europe, Asia and Africa.

* I here use these terms with reference only to the skull, the fissure being that opening existing in most Ruminants, filled up during life by membrane, between the nasal, frontal, lacrymal and maxillary bones; and the fossa, the depression upon the surface of the lacrymal bone immediately before the orbit, generally affording some indication as to the existence and structure of the suborbital sinus.

<i>G. dorcas.</i>	} Of these species I have seen skulls.	<i>G. subgutturosa.</i>
<i>G. Bennettii.</i>		<i>G. Scemmeringii.</i>
<i>G. euchore.</i>		<i>G. mhorr.</i>
<i>G. gutturosa.</i>		<i>G. colus.</i>
		<i>G. kemas.</i>

Several of the so-called species that are closely allied in size and colour to *G. Dorcas*, appear to me to be merely varieties, as some of them have been considered by the older naturalists.

This genus seems prone to exhibit in certain species inhabiting more temperate regions, enlargements of, or appendages to, the respiratory passages; for example, the enlarged larynx of *G. gutturosa*, the elevated nose of *G. colus*, and the appendages to its sides in the Chiru (*G. kemas*); these seem to be physiological adaptations, in no case marking a group, and therefore insufficient to warrant generic distinction, which has been made in the two latter instances. However, not having as yet seen entire skulls of these species, I retain them provisionally in this genus, judging by the horns. I think few naturalists will set forth, with Mr. Gray, the colour of the horns of the Saiga as a generic character. Even in the *G. Bennettii*, so closely allied to *G. dorcas*, Mr. Hodgson states that the suborbital sinus is wanting, and he places the animal in a distinct genus, *Tragops* (afterwards altered to *Tragomma*), on account of this difference; while Colonel Sykes, the original describer of the species, affirms that it exists, though of very small size. Mr. Hodgson also denies it to the Chiru, which forms his genus *Panthelops*, and to which he assigns only five molars in each series.

CERVICAPRA.

A small suborbital fissure, and a very large fossa; the tubercles and median groove of the basioccipital bone well-developed. The other cranial characters as in *Gazella*.

Horns annulated, spirally twisted.

Hab. India.

C. bezoartica.

The remainder of this group, if we exclude the *Cephalophi* and the four-horned Antelopes of India, consists of a number of small species, apparently nearly allied, forming the subgenera *Tragul* and *Neotragus* of Major Hamilton Smith. These are very distinguishable by the former having vertical, the latter recumbent horns; to the former, however, must be added the *Ourebi* (*A. scoparia*), from his subgenus *Redunca* (*Eleotragus*). Mr. Gray divides them into several genera, depending upon the presence or absence of inguinal pores and knee-tufts, the shape of the hoofs, the presence or absence and form of the "tear-bag," the condition of the fur; and one genus, founded upon two very young specimens, is characterized by the absence of the lateral rudimental hoofs. Most of these characters I must decidedly reject; and as I do not consider the evidence of dried skins quite satisfactory with regard to certain others, and have as yet

seen skulls of only two species, I will content myself at present with adopting only the two genera of Major Smith; using however, for the first one, Mr. Gray's generic name *Oreotragus*, without at present wishing to enter into the question of its right to supersede that of *Tragulus*, because the latter name has been also used by Mr. Gray for a group of small Musk Deer, needlessly separated from the Meminna.

I do not see sufficient in the small horns contained in the Museum of the College of Surgeons to warrant the adoption, as a genus, of Major Smith's subgenus *Raphicerus*. I will not attempt to conjecture to what species they may belong: they show nothing to prevent their ranking among the *Oreotragi*; and their locality, said to be the East Indies, while all the members of this genus are African, is not known with certainty.

OREOTRAGUS.

A small suborbital fissure, with a large deep fossa suddenly pressed in before the orbit; the masseteric ridge rising a little before the orbit; the auditory bulla rather large and prominent; the basioccipital bone flat and smooth; the median incisors expanded at their summits, and the molars without supplemental lobes.

Horns small, placed forwards, vertical.

Hab. Africa.

O. saltatrix.

O. scoparius.

O. tragulus.

O. melanotis.

} Of these two species I
} have seen skulls.

NEOTRAGUS.

Horns recumbent.

Hab. Africa.

N. saltianus.—Of this animal I have seen no skull, but adopt for the present Major Smith's division, as the different direction of the horns is well-marked. It has the suborbital sinus, however, although its absence is assigned as a character by Major Smith. Of the other species included in the subgenus, I have seen but the two young specimens upon which Mr. Gray has founded his genus *Nanotragus*; they having no horns, I will not here venture to point out their location. The lateral rudimental hoofs are also wanting in at least one species of the last genus, the *Oreotragus Tragulus*, which Mr. Gray places in his genus *Calotragus*.

The skulls of the species of the two following genera are distinguished from those of the preceding ones by their having no suborbital fissure, and the fossa being large and not so suddenly pressed in in front of the orbit; and by the horns (or at least, in one case, the principal pair) being thrown back quite to the posterior edge of the frontal bone.

CEPHALOPHUS.

No suborbital fissure, a large fossa occupying the whole side of the

cheek; the nasal bones expanded behind, reaching over a little way into the fossa. The other cranial characters as in *Oreotragus*.

Horns placed far back, inclined backwards.

Hab. Africa.

<i>C. mergens.</i>	<i>C. Maxwellii.</i>
<i>C. coronatus.</i>	<i>C. monticola.</i>
<i>C. silvicultrix.</i>	<i>C. punctulatus.</i>
<i>C. Ogilbii.</i>	<i>C. grimmia.</i>
<i>C. Natalensis.</i>	<i>C. Whitfieldii.</i>
<i>C. rufilatus.</i>	

I have taken this list of species from Mr. Gray's paper on the genus, published in the same volume of the 'Annals and Magazine of Natural History,' omitting a few that seem to me likely to prove varieties, and adding two, which I find named in the Museum, and not included in his paper. I have only seen skulls of two or three species, but no one will dispute the limits of this very distinct genus.

TETRACERUS.

The nasal bones not expanded; the other cranial characters the same as in *Cephalophus*, with the addition of a second pair of horns of small size, placed over the orbits.

Hab. India.

T. quadricornis.

T. subquadricornis.

ELEOTRAGUS.

Nasal opening rather lengthened, the nasal processes of the intermaxillary bones long, yet not always reaching the nasal bones; a large infraorbital fissure, but no fossa; the masseteric ridge ascending rather high; the auditory bulla large and swollen; the basioccipital bone with its median groove and tubercles well-developed; the median incisors expanded at their summits; a well-developed supplemental lobe in the first true molar of each jaw, and usually more or less appearance of it in those behind.

Horns inclining backwards and outwards, transversely wrinkled, gently curving upwards, and a little inwards towards the tip.

Hab. Africa.

<i>E. reduncus.</i>	<i>E. adenota.</i>
<i>E. isabellinus.</i>	<i>E. sing-sing.</i>
<i>E. capreolus.</i>	<i>E. ellipsiprymnus.</i>
<i>E. arundinaceus.</i>	<i>E. leche.</i>

I have seen skulls of the four preceding the last-named.

It is quite evident, both from the structure of the skull and horns, and from the general external appearance and markings, that the *Antelope adenota* of Major Smith, and certain large species forming Dr. Andrew Smith's genus *Kolus*, belong truly to this form, and that in the latter case, at least, naturalists must have been deceived by mere dimensions. The similarity of character between the horns of the *Adenota* and those of the other species is very recognizable, al-

though Major Smith, judging by these parts alone, supposed them to belong to the lyrate type. The species does not appear among those mentioned in Mr. Gray's paper in the 'Annals and Magazine of Natural History,' but from the name and place assigned to the specimen in the British Museum, he appears to have evaded the difficulty by constituting it a genus of itself, which is placed near the genus *Kolus*, the genus *Eleotragus* (as in his paper) being far removed. The skull in the Museum, although the occiput is lost, bears full evidence of its real affinity. Among the interesting additions to South African zoology discovered by those travellers who have visited the great lake recently discovered in that region, an undescribed species of Antelope*, of which a beautiful skin was recently brought before the Society, will perhaps assist the more sceptical in osteological characters in arriving at a just conclusion on this point, since, while it has the stature and lengthened horns of the *ellipsiprymnus*, it has the brilliant colour and the external marks (particularly the dark stripe down the fore-leg) which characterise the smaller species.

This genus does not seem to show any particular affinity for any of the rest, and forms a well-marked group, of which the species are scattered over various parts of Africa, and are mostly noted for their predilection for the vicinity of water.

I here again adopt Mr. Gray's generic name, to avoid the necessity of altering the name of one of the species, the *E. reduncus*.

STREPSICEROS.

The nasal opening of moderate size; a suborbital fissure, but no fossa; the masseteric ridge not extending high; the auditory bulla swollen and prominent; the basioccipital bone with its anterior and posterior pairs of tubercles well-developed, the former separated by a deep median groove; the median incisors expanded at their summits; the molars without supplemental lobes.

Horns inclined backwards from the base, twisted, with one or more longitudinal angular ridges.

Hab. Africa.

S. cudu.

S. euryceros.

S. Angasii.

S. oreas.

S. Derbianus.

S. scriptus.

S. silvaticus.

S. decula.

The general aspect of the skull in this group reminds one a little of that of the Deer. The species all agree very closely, both in structure of the skull, and in the direction, twisting, and ridges of the horns, the Coudou differing only in having the spiral wide and open, and in the horns being confined to the male, while the Eland is only a gigantic representation of the smaller species. *S. euryceros*, *S. Angasii*, and a species most probably distinct from the rest, of which Capt. Allen brought a skull from the Bight of Biafra, show an intermediate condition of the horns; and in *S. Angasii*, at least, they are known to be wanting in the female. Major Smith himself has here

* Since named *Kolus leché* by Mr. Gray.

been deceived by size, and been led to place the subgenus *Tragelaphus* under his genus *Antelope*, and the others under his genus *Damalis*; even availing himself of stature, and in the case of the Coudou, of a white streak over the eyes, to help out the meagre distinctions. In associating the Nyl-Ghau with these animals, Mr. Gray has even allowed colour and marking to deceive him, for in this animal the horns are not even spiral; but in another respect the characters assigned to his *Strepsicercæ* agree with the Nyl-Ghau, and *not* with the others, which certainly have no suborbital sinus, nor have any of them an ovine muzzle, by which Mr. Gray distinguishes the larger genera from the *Tragelaphus*. In these latter points Major Smith is correct.

I will now proceed to the "Antelopes of the Desert" of Mr. Gray, a very well-marked, natural group, consisting of two distinct genera, which have usually been widely separated. Mr. Blyth, however, in the translation of Cuvier's 'Animal Kingdom,' hints at their affinity, and Mr. Waterhouse informs me that he has long held that opinion. Indeed he has placed the species next each other in the Catalogue of the Society's Museum.

ALCELAPHUS.

A large deep impression before the orbit, but no fissure; the maseteric ridge not extending high; the bones of the face lengthened downwards and forwards, and the occiput also prolonged and drawn downwards; the auditory bulla large and prominent, enclosing a large rounded space for the attachment of the stylohyal bone; the basioccipital tubercles high and sharp, the groove between them narrow in front, wide behind, with a flat space between the occipital condyles; the median incisors expanded at their summits; the molars rather small, narrow, and without supplemental lobes, showing, when somewhat worn, a pit in the middle.

Horns placed high, ringed at the base, with double flexures more or less marked.

Hab. Africa.

A. bubalis.

A. lunatus.

A. Senegalensis.

A. pygargus.

A. caama.

I have seen skulls of the three last-named.

Mr. Gray calls a portion of this genus "Boselaphus," doubtless intending *Alcelaphus* of De Blainville, which being antecedent to Major Smith's name *Acronotus*, should certainly be adopted. The genus is a very natural one, and the characters by which Mr. Gray proposes to divide it into two, are by no means sufficient. The last-mentioned species, *A. pygargus*, has usually been placed among the Gazelles, where it was left by Major Smith and by Mr. Blyth, who speaks of it as leading "through *A. Caama*, *Bubalis*, &c. to the Gnus." Mr. Waterhouse, who in the Catalogue of the Society's Museum uses the generic name *Antelope* throughout, places this species

between the Gazelles and the others of its natural genus, to which the Gnu follows. Mr. Gray, who had left it with the Gazelles in the 'List of Mammalia' in the British Museum, has removed it to its true place in his paper in the 'Annals and Magazine.'

CATOBLEPAS.

The general characters of the skull the same as in *Alcelaphus*; but the depression before the orbit less marked; the occiput rather less prolonged, and its base, together with the auditory bulla, broader.

Horns broad at the base, inclining more or less downwards and outwards, and then bent upwards.

Hab. Africa.

C. gnu.

C. taurina.

The next genus is included by Mr. Gray among his "Caprine Antelopes," but differs from them in having a suborbital sinus or gland, of large size in some species, and of peculiar structure, opening externally by a single pore. Their nasal bones resemble those of the domestic Sheep, and their structure being altogether rather heavy, they might be called *Ovine Antelopes*.

NEMORHÆDUS.

No suborbital fissure; the fossa rounded, shallow, very variable in size, sometimes very minute; the nasal bones rather short and broad, joining the maxillaries only by the interposition of some imperfect ossification or separated from them altogether; the masseteric ridge extending high before the orbit; the auditory bulla very small; the basioccipital bone broad, with moderately developed eminences; the middle incisors slightly expanded at their summits; the molars without supplemental lobes.

Horns rising behind the orbits, annulated and wrinkled at the base, inclined and curved backwards.

Hab. India and its islands.

C. bubalina.

C. Sumatrensis.

C. goral.

This genus is too well-marked by nature to admit of subdivision. Although the "tear-bag" is said to be wanting in the *Goral*, there is certainly a slight depression upon the lacrymal bone, and the pore with which the gland opens may be so small in this species as to escape detection in dried specimens; but if it be really absent, the instances of the genera *Gazella* and *Ovis* must warn us against founding a genus solely on the want of this organ, while on the other hand, a difference in its structure seems to be of great zoological importance.

Since the foregoing observations were written, I have perused Mr. B. H. Hodgson's interesting account of the *Budorcas taxicolor*, in the 'Journal of the Asiatic Society of Bengal,' and a glance at the representations of the skull indicates very plainly that it is closely allied to *Nemorhædus*, to which Mr. Hodgson admits certain resemblances, and that it has no relationship with the Gnu, or the Musk Ox. The characters that I assigned to *Nemorhædus* would appear

to serve as well for this new and singular genus, except that there seems to be no suborbital depression, and the masseteric ridge, as may be expected from the general elevation of the skull, does not rise before the orbit. The horns, whose peculiar twist must constitute the diagnosis of the genus *BUDORCAS*, appear, from the rough figures given, to have the wrinkling at the base very similar to that in *Nemorhædus*.

The following genera may be considered as in some degree allied, and deserve the name of Caprine Antelopes. They have no suborbital sinus, but have a fissure in the skull, and their incisors are not widened at the summits.

RUPICAPRA.

A minute suborbital fissure, but no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla very small and compressed; the basioccipital bone flat; the incisors equal-sized, vertical; the molars without supplemental lobes.

Horns slender, round, vertical, and hooked backwards at the tip.

Hab. Europe.

R. tragus.

DICRANOCERUS.

No suborbital depression; the fissure lengthened; the nasal bones widest posteriorly; the orbit a little elevated above the line of the face, and the masseteric ridge not rising before it; the auditory bulla moderate, compressed and angular; the incisors equal-sized, sloping; the molars without supplemental lobes.

Horns vertical, compressed, with a process on their anterior side, and hooked backwards at the tip.

Hab. North America.

D. Americanus.

APLOCERUS.

Horns round, vertical, gently curved backwards.

Hab. North America.

A. Americanus.

I have seen no skull of this animal, but leave it for the present in this location.

I must forego all notice of the *Ixalus probaton* of Mr. Ogilby, as there is no skull to be seen, and the horns in the only specimen known are quite in a rudimentary condition.

The genera next to be considered are the "Cervine Antelopes" of Mr. Gray, exclusive of the genus *Kolus*, which I have rejected. With the exception of the Nyl-Ghau and some of the *Eleotragi*, they are the only members of the old genus *Antilope* that have well-developed supplemental lobes in all the true molars; they have always been placed near together.

ÆGOCERUS.

A small suborbital fissure, but no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla moderate; the occipital portion of the skull much prolonged; the basioccipital portion widened, its two pairs of tubercles much developed, with a deep groove between them; the incisors gradually increasing in size to the median pair, which are not expanded at their summits; the molars with largely-developed supplemental lobes.

Horns rising immediately above the orbits, curved backwards, annulated.

Hab. Africa.

Æ. leucophæus.

Æ. niger.

ORYX.

A suborbital fissure, but no fossa, the masseteric ridge not extending high; the auditory bulla large and compressed; the basioccipital bone with its tubercles well-developed; the molars with supplemental lobes.

Horns straight or gently curved, annulated, placed in a line with the face.

Hab. Africa.

O. gazella.

O. leucoryx.

It is only in Mr. Cumming's collection that I have seen entire skulls of the Gemsbok, and the lower jaw being absent, I could not ascertain the character of the incisors. The skull of the *Leucoryx* I have not seen.

ADDAX.

A small suborbital fissure, but no fossa; the masseteric ridge ascending before the orbit; the auditory bulla large, prominent, and compressed; the basioccipital bone with its anterior pair of tubercles slightly, the posterior well, developed; the median incisors expanded at their summits; the molars with supplemental lobes.

Horns nearly in a line with the face, annulated, spirally twisted.

Hab. Africa.

A. naso-maculata. I have seen but one skull of this animal, and that is a young one, in the Society's collection, still retaining the whole of its milk dentition.

Before proceeding to the Sheep and Goats, the Nyl-Ghau requires to be introduced. It seems to stand alone, not having a decided affinity for any other genus.

PORTAX.

The nasal opening rather small, with the nasal bones small and narrow; a minute suborbital fissure; no fossa, but a smooth line upon the lacrymal bone; the masseteric ridge not extending high; the auditory bulla moderate, bulbous, compressed; the basioccipital

bone with the posterior tubercles moderately developed; the anterior ones scarcely at all; the molars with supplemental lobes.

Horns short, round, vertical, slightly bent forwards.

Hab. India.

P. picta.—The only skull that I have seen (that in the British Museum) wants the incisor teeth, so that I could not ascertain their structure. The smooth line upon the lacrymal bone terminates in a small foramen, but on one side is continued for some distance forwards upon the maxillary bone, where it terminates in the same way; and it may even be faintly traced on the other side for some distance beyond the foramen.

CAPRA.

A small suborbital fissure, no fossa; the masseteric ridge ascending high before the orbit; the auditory bulla prominent and compressed; the basioccipital flat, with its processes developed; the middle incisors not expanded; the molars without supplemental lobes.

Horns erect, compressed; curved backwards and a little outwards, or twisted; annulated or nodulous, and furnished with one or more longitudinal ridges.

Hab. The Northern portions of the Old World.

C. hircus.

C. Falconeri.

C. ibex.

C. jemlaica.

I do not see sufficient reason for separating the Jemlah Goat, as has been done, under the names of *Hemicapra* and *Hemitragus*.

OVIS.

A more or less marked, rounded, suborbital depression, but no fissure; the masseteric ridge ascending high before the orbit; the auditory bulla small; the basioccipital flat, more or less expanded anteriorly by the extension of the anterior pair of tubercles, the posterior ones small; the incisors nearly equal-sized, sloping; the molars without supplemental lobes.

Horns broad at the base, transversely wrinkled, bent outwards, with a more or less marked spiral curve in a direction contrary to that occurring among the Antelopes, and a longitudinal ridge or angle.

Hab. The Northern hemisphere.

O. ammon.

O. nahura.

O. Vignei.

O. tragelaphus.

O. aries.

It is a matter of surprise to me that naturalists should almost universally have given *no* suborbital sinus, as characteristic of the genus *Ovis*, since it is very perceptible in the Domestic Sheep; and in some other species, especially the *O. ammon*, judging by the appearance of the stuffed specimens, and by the fossa upon the skull, it must be of very considerable size. I do not perceive it, however, in the *O. tragelaphus*, nor in the *O. nahura*. Although Mr. Gray maintains the long-established error, the observations of Mr. Ogilby and Mr. Hodg-

son agree with my own in this respect; the latter gentleman, who far exceeds Mr. Gray in the number of generic divisions, even separates *O. nahura* and *O. barhel* as a distinct genus under the name *Pseudovis*, on account of the absence of "eye-pits."

OVIBOS.

A small depression in front of the orbit; no fissure; the masseteric ridge ascending before the orbit; the auditory bulla of moderate size; the basioccipital bone broad and flat, with a ridge and a fossa on each side; the anterior part of which is rough; the fossa at the side of the occipital condyle filled up and produced into a blunt process, upon which the articulating surface is continued; the molars without supplemental lobes.

Horns broad at the base, tapering, pressed downwards against the sides of the head, and the points bent upwards.

Hab. The North Polar Regions.

O. moschatus.—This animal, which derives its name from its general aspect being intermediate between that of the Ox and that of the Sheep, has generally been placed among the Bovine forms. Taking the aggregate of its characters, it appears to me to be at least as nearly, if not more, allied to the Sheep, but should most properly stand alone.

The remaining genera constitute the true Bovine type, and agree among themselves in most characters of the skull. I fear that Mr. Gray's distinctions, in the extent of the intermaxillary bones upon the sides of the nasal aperture, will not always hold good. Their general cranial character may be given first;—

No suborbital fissure, nor fossa; the masseteric ridge ascending rather high before the orbit; the auditory bulla moderate, compressed; the basioccipital bone with its tubercles well-developed, and a deep groove between them; the incisors nearly equal-sized, slightly bending outwards, and the molars with well-developed supplemental lobes.

BOS.

Horns placed upon the extremities of the ridge terminating the occipital plane, directed outwards.

Hab. Europe and Asia.

B. taurus.

B. gaurus.

B. frontalis.

B. bantiger.

BISON.

Horns round, situated in a plane anterior to that of the occiput, directed outwards and curved upwards.

Hab. The Northern Temperate regions.

B. urus.

B. grunniens.

B. Americanus.

The last-named species is a true Bison, as the position of the horns,
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and the woolly fur, make apparent ; the fur being generally more copious, may reasonably be expected to extend further upon the muzzle ; and the generality of instances proves that the extent of naked surface may differ in very nearly allied species, and is not sufficient to warrant generic distinction. Therefore I do not think it advisable to adopt the genus *Poëphagus*.

BUBALUS.

Horns attached in a plane anterior to that of the occiput, flattened or trigonal, inclined outwards and backwards, with the point bending upwards.

Hab. Southern Asia, its islands, and Africa.

B. buffelus.

B. depressicornis.

B. brachycerus.

B. Caffer.

Although Major Smith was deceived as to the affinities of the Anoa, later as well as earlier naturalists have assigned it to its true place, and a glance at the stuffed specimen in the British Museum leaves the matter beyond a doubt. I have examined the skull in the Museum of the College of Surgeons, and cannot see that it has even a title to generic distinction. Naturalists seem at all times to have been prone to assign generic rank to whatever was mysterious or difficult to classify, and I can in no other way account for this species being made a genus.

It will be seen that my endeavour has been rather to ascertain and demonstrate whatever natural degrees of relationship exist among the species of this family, than to compose a system for mere convenience of reference ; but so far from that being any hindrance to the practical adoption of my views, I think that in arranging the specimens in a museum, or the materials of a work, it will generally be found more convenient to be able to dispose the members of a natural group in whatever order may suit our immediate object, than to be compelled to place them in accordance with the stringent laws of a purely analytical method ; and that for the purpose of referring a new species to its true location, when we have not the means of observing all characters that may be necessary for the determination of a series of natural affinities, the external characters which can be assigned to a group when its limits are well made out, will be found sufficient ; while on the other hand, not only the external characters, but sometimes even those of anatomical structure, will, in a group which has not been previously subjected to a full and careful examination, be as the letters of an unknown language, often leading into error and confusion.

With regard to nomenclature, I have used such names as I find most generally adopted by later naturalists who have given attention to this subject, generally taking, where I had a choice, such as appeared to have been of earliest date ; and as I only enumerate such species as I have seen, I must not be considered, although I have omitted a few which appear to be varieties, as rejecting all that are left out.

2. DESCRIPTION OF A NEW GENUS OF THE FAMILY MELANIANA, AND OF MANY NEW SPECIES OF THE GENUS MELANIA, CHIEFLY COLLECTED BY HUGH CUMING, ESQ.; DURING HIS ZOOLOGICAL VOYAGE IN THE EAST, AND NOW FIRST DESCRIBED. BY ISAAC LEA AND HENRY C. LEA, PHILADELPHIA*.

Genus PACHYCHILUS†.

Testa conica. Apertura ovata, basi integro. Labrum crassum. Columella supernè incrassata. Operculum suborbiculare, corneum.

The genus *Melania* has been found to embrace such a vast number of species in various parts of the globe, that it has become very desirable to separate any definite group with sufficient persistent characteristics. The thickened lip sufficiently distinguishes the proposed genus from *Melanopsis* and *Melania*‡. It differs from *Melanopsis* also in its having no sinus, while it resembles it in the possession of a thickened columella above. From *Melania* it differs also in having this callous columella. The species on which it is proposed to found this genus has a mouth looking like a thick-lipped *Bulimus*. The operculum differs somewhat from that of any *Melanian* I have seen. Its polar point is subcentral, from which two or three spiral revolutions are made; then a thinner margin surrounds these spirals.

The animal has not been observed, and may and probably will prove very different from *Melania*. Its proper position, however, in the system will most likely be found to be between *Melanopsis* and *Melania*, and there I would at present place it.

A second and very distinct species may be added to this genus—the *Melania lævissima*, Sowerby, described in Deshayes' edition of Lamarck. It inhabits Colombia, and is a shorter, wider, and much thicker shell, with a large white mouth.

PACHYCHILUS CUMINGII. *P. testâ lævi, elevato-conicâ, subcrassâ, nitidâ, fusco-nebulosâ; spirâ elevatâ, acuminatâ; anfractibus undecim, convexiusculis; suturis linearibus; aperturâ parviusculâ, subrotundâ, ad basim rotundâ, intus fuscâ; labro valdè expanso; columellâ supernè incrassatâ.*

Hab. Large rivers, Copan, Central America.

Length 1·4, diam. ·5 of an inch.

Remarks.—This is a very remarkable shell among the *Melaniens*. It is of fine symmetry, the whorls being very regular to the apex. The brownish cloudiness gives the whole surface a dark hue, while the smoothness of the whorls gives it almost a polished appearance. It differs very much in form from *Melania lævissima*, Sow., which naturally belongs to the same genus, and which is adopted above; but it has the same character of mouth and exterior colour. Both

* All the species described are in the Cabinets of Hugh Cuming and Isaac Lea.

† Παχὺς, thick, and χεῖλος, lip.

‡ Lamarck describes the family *Melaniens* as having a sharp outer lip, "le droit toujours tranchant;" but this genus naturally belongs to *Melania*, *Melanopsis*, and *Pirena*.

species under the microscope exhibit very minute revolving striæ. The aperture is rather more than one-fourth the length of the shell. The operculum has its polar point subcentral.

The genus *Melania* of Lamarck abounds in a most extensive number of species, and is undoubtedly the most interesting of the genera of the family *Melaniæna*. It is distributed round the whole circumference of the globe, and inhabits the fresh waters of America at least as far north as 45° latitude, and it probably exists quite as far south, as it is found in New Zealand. In the north of Europe there is not a single species known, while very few are found in the southern part of that quarter of the world. In the middle, southern and south-western portions of the United States, the greatest number of species seem to be developed on this continent; and in the States of Kentucky, Ohio, Tennessee and Alabama they are the most profuse, and present an almost endless variety of forms, extending to an incredible number of species. The rivers and lakes of India and Africa have not yet been well explored; but while they present some of the most striking and beautiful species, it may be doubted if they abound in the variety of forms which are found in the United States. The Philippine Islands form a most prolific district, where the development of these forms seems to have been greatly extended. Mr. Cuming, with an industry, energy and perseverance which portray the true naturalist, devoted several years to the Mollusca of this remarkable group of islands, and his reward has been, the discovery of a vast number of species heretofore unknown to science; and he well deserves the gratitude of all students of this branch of natural history for his devotion to the collection of a museum, almost, if not quite, unequalled in the Mollusca.

MELANIA CANALIS. *M. testâ lævi, acuto-conoideâ, subtenui, tenebroso-castaneâ, flammis longitudinalibus ferrugineis ornatâ; spirâ elevatâ, ad apicem costatâ; suturis impressis canaliculatisque; anfractibus duodecim, subconvexis; aperturâ ovatâ, ad basim putulâ, intus albidd.*

Hab. Small streams, island of Guimaras, Philippines.

Length 2.1, diam. .6 of an inch.

Remarks.—This is rather a large and somewhat robust species. The full-grown specimens are of a dark chestnut-brown, the younger sometimes a pale horn-colour, with longitudinal flammate marks, nearly equidistant, and with distinct minute transverse striæ. The most remarkable character of this species is the impressed and rather sharp channel at the junction of the whorls. The aperture is nearly one-third the length of the shell, and the base is expanded, the columella below being flattened.

MELANIA FÆDA. *M. testâ lævi, conoideâ, subcrassâ, tenebroso-fuscâ, rufo-nebulosâ; spirâ subelevatâ; suturis subimpressis; anfractibus decem, planulatis; aperturâ ellipticâ, subcontractâ, ad basim subangulatâ, intus tenebroso-castaneâ; labro margine cærulescente.*

Hab. Rocky stream, Java.

Length 1·6, diam. ·5 of an inch.

Remarks.—In the adult specimens the edge of the aperture is bluish white, and within more or less brown. In all cases the columella is white in the four specimens under examination. They are covered nearly over the whole surface with a black deposit of oxide of iron. Near the base there are seven to ten indistinct striæ. The aperture is about one-third the length of the shell. The operculum is ovate, and does not present any peculiar character.

MELANIA SOBRIA. *M. testâ lævi, acuto-conoideâ, subcrassâ, luteo-corneâ; spirâ elevatâ, ad apicem costatâ; suturis impressis; anfractibus duodecim, planulatis; aperturâ parvâ, subovatâ, intus albidâ, ad basim rotundatâ; columellâ regulariter curvatâ.*

Hab. Very small streams, Siquijor, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—A very regularly formed, light-coloured species. There are a few indistinct striæ near the base. The sutures are very regular and thread-like. The upper whorls are slightly maculate, and those nearest to the apex minutely plicate. The aperture is rather more than the fourth of the length of the shell, and is rounded at the base of the columella.

MELANIA SUBULA. *M. testâ lævi, acuto-conoideâ, tenui, castaneâ; spirâ valdè elevatâ, acuminatâ; suturis impressis; anfractibus duodecim, subconvexis; aperturâ parvâ, contractâ, intus vel albidâ vel rufo-castaneâ.*

Hab. Small river in the province of Ho Ho, isle of Panay, Philippines.

Length 1·8, diam. ·4 of an inch.

Remarks.—This is a delicately formed species, very much attenuated, with six or eight impressed, small striæ at the base. In the darker specimens, the upper part of the whorl at the suture is lighter-coloured than the other part. The upper whorls are finely striate. The aperture is small, about one-fourth the length of the shell, and rounded at the base of the columella.

MELANIA ACUS. *M. testâ lævi, conoideâ, subtenui, corneâ; spirâ acuminatâ, ad apicem costatâ; suturis subimpressis; anfractibus undecim planulatis; aperturâ parvâ, ovatâ, intus cærulescente; columellâ regulariter curvatâ.*

Hab. Small stream, Guimaras, Philippines.

Length 1·1, diam. ·3 of an inch.

Remarks.—This is a regularly formed, small species. The specimens under examination are nearly covered with a deposit of oxide of iron, which on removal displays a horn-coloured epidermis. The aperture is nearly one-third the length of the shell, and is rounded at the base.

MELANIA DERMESTOIDEA. *M. testâ lævi, politâ, subcylindrâ, crassâ, tenebroso-castaneâ; spirâ subelevatâ; suturis impressis; anfractibus sex, subplanulatis; aperturâ ovatâ, ad basim canaliculatâ, intus rufescente; labro incrassato.*

Hab. Seychelles Islands.

Length .6, diam. .2 of an inch.

Remarks.—The most marked character of this species is the notched channel of the base, where the colour is rather darker. The outer lip is thick and rounded. The superior part of the whorl in some specimens is lighter in colour. In its general aspect this species resembles *Melania simplex*, Say. The epidermis is very lustrous. The aperture is nearly one-half the length of the shell.

MELANIA CONTRACTA. *M. testā lævi, ovato-elongatā, pallidā, tenui; spirā elevatā; anfractibus novem, planulatis; aperturā ovatā, constrictā, ad basim canaliculatā, intus vel albidā vel rufā; columellā contortā reflexāque.*

Hab. Seychelles Islands.

Length .8, diam. .3 of an inch.

Remarks.—This, like the *dermestoides*, herein described, from the same locality, is remarkable for the notched channel at the base. They may easily be distinguished by the *contracta* having a more elevated spire, greater number of whorls, being of a lighter colour, and in the aperture being longer and more twisted. There is a disposition in the upper part of the columella to be thickened and rufous, and the twist and backward turn are very remarkable. The aperture is about one-third the length of the shell.

MELANIA FERRUGINEA. *M. testā lævi, nitidā, ventricoso-conoided, inflatā, crassā, ferruginē; spirā subelevatā; suturis valdē impressis; anfractibus sex, convexis; aperturā magnā, subrotundā, intus albidā.*

Hab. Zanzibar, East Africa.

Length .9, diam. .4 of an inch.

Remarks.—The rather inflated form of this species gives it the aspect of some of the *Paludinæ*. A single specimen, and not an entirely perfect one, has only been submitted for examination. It seems to differ from any described species, while it has no very distinctive character. The aperture is very nearly one-half the length of the shell.

MELANIA IMPURA. *M. testā lævi, subcylindraced, compressā, subcrassā, viridi-cornē; spirā subelevatā; suturis valdē impressis; anfractibus planulatis, supra geniculatis; aperturā ellipticā, subcontractā, ad basim retusā, intus albidā; columellā regulariter incurvā.*

Hab. Naga, province of South Cumarines, Luzon, Philippines.

Length .9, diam. .35 of an inch.

Remarks.—The angle on the superior portion of the whorls gives this species a very distinct aspect. This angle is not very acute, but it is very marked in all the four specimens under examination. The apex in each being decollate, the number of whorls cannot of course be correctly ascertained; there may be about seven. The colour of the epidermis is uniform and of a greenish horn-colour. The aperture is rather more than one-third the length of the shell, and is rounded and retuse at the base.

MELANIA COCHLIDIUM. *M. testâ lævi, subulatâ, subcrassâ, rufo-corned; spirâ elevatâ, acuminatâ, ad apicem minutè plicatâ; suturis regulariter impressis; anfractibus duodecim, subcompressis, anfractu ultimo supra angulato, magnò, aperturâ latè ovatâ, parvâ, ad basim retusâ, intus albidâ; columellâ regulariter incurvâ.*

Hab. Very small streams, islands of Siquijor and Guimaras, Philippines.

Length 1.5, diam. .5 of an inch.

Remarks.—This is a very remarkable species, having a single elevated, revolving rib on the superior part of the last whorl, which causes a somewhat impressed channel above. The four specimens under examination from Siquijor are fresh and with perfect epidermis, which varies on the younger specimens to rather a pale horn-colour, while the more mature ones are of a reddish horn-colour. The four from Guimaras are "dead shells," rather more robust, with a portion only of the epidermis remaining, which is rufous. The aperture is about one-fourth of the length of the shell. The operculum has its polar point near the base on the left side.

MELANIA CINCTA. *M. testâ lævi, subulatâ, subtenui, rufo-castaneâ; spirâ valdè elevatâ, acuminatâ, ad apicem plicatâ; suturis impressis, linearibus; anfractibus tredecim, subconvexis; anfractu ultimo uno-vittato; aperturâ dilatatâ, ovatâ, intus fusco-fasciatâ, ad basim rotundâ; columellâ contortâ.*

Hab. India.

Length 2.2, diam. .6 of an inch.

Remarks.—The form of this species is very much like that of *Melania aculeus* (nobis), but it is a more attenuate species. The single light band on the lower whorl seems to be peculiar to this species. It is below the middle part of the whorl, and is distinctly visible on the inside in the three specimens under examination. The upper whorls have regular, oblique, somewhat distant folds, on two of the specimens, which are crossed by minute striæ. The lower part of the whorl has indistinct striæ. The aperture is not large, being less than one-fourth the length of the shell, and it is rounded at the base. The columella is much incurved.

MELANIA LANCEA. *M. testâ lævi, subulatâ, subtenui, corned; spirâ elevatâ, ad apicem striatâ; suturis impressis; anfractibus duodecim, convexis; aperturâ ovatâ, intus albidâ, ad basim rotundâ; columellâ angulariter incurvâ.*

Hab. Ohcataroa, Society Islands.

Length 1.6, diam. .5 of an inch.

Remarks.—This species is in form somewhat like the *M. aculeus* (nobis), but is a smaller shell and not quite so attenuate. In the four specimens under examination small striæ are distinctly marked on the superior or younger whorls, and on two of them some of the striæ are continuous on the lower whorls. The aperture is not large, being not quite one-third the length of the shell. The columella is much incurved and recurved.

MELANIA EPISCOPALIS. *M. testâ plicatâ, turritâ, subcrassâ, tenebroso-castanê; spirâ elevatâ; suturis impressis; anfractibus subconvexis, propè suturam superiorem concavis; plicis raris, subacuminatis; aperturâ magnâ, ellipticâ, intus cærulescente; columellâ contortâ.*

Hab. A sluggish river, Malacca.

Length 2·4, diam. ·8 of an inch.

Remarks.—This is a remarkable and interesting species, and differs from any which has been described, in having rather large and somewhat distant folds rising on the upper part into nodular points, in all the four specimens submitted for examination. The apex of these specimens being truncated, the number of whorls cannot be ascertained. A perfect adult would probably present about ten. The folds are distinct on the four lower whorls only. On the middle of the lower whorl there is a slightly elevated line, below which are about six obscure striæ. The aperture is large, and more than one-third the length of the shell; it is twisted, and has an elongated base. The columella is whitish and very much incurved. The operculum is more spiral than usual, and the polar point more toward the centre.

MELANIA BLATTA. *M. testâ plicatâ, elongatè conoided, crassâ, castaneo-nigricante; spirâ elevatâ, crebrè costatâ; anfractibus planulatis, infra suturas concavis; plicis crebris ornatis; aperturâ magnâ, ovatâ, supernè angulatâ, ad basim rotundâ, intus cæruleâ; columellâ tortâ, supernè incrassatâ.*

Hab. Rapid river and small streams, Luzon, Philippines.

Length 2·6, diam. ·7 of an inch.

Remarks.—A very dark-coloured and remarkably fine species, with numerous, nearly parallel, perpendicular folds, which number some eighteen or twenty, and exist on every whorl in the eight specimens under examination. The four large ones are truncate, but the younger and more perfect would indicate the existence of about ten whorls. It differs from the *episcopalis* in being more attenuate, in having more folds and a much less twisted columella. The aperture is large, and rather more than one-fourth the length of the shell.

MELANIA COSTELLARIS. *M. testâ plicatâ, supernè striatâ, acuminatâ, subcrassâ, tenebroso-castanê; spirâ elevatâ; suturis linearibus; anfractibus decem, subplanulatis; anfractu ultimo magno, geniculato; plicis numerosis; aperturâ parvâ, dilatâ, ovatâ, supernè angulatâ, ad basim rotundâ, intus cærulescente; columellâ incurvâ.*

Hab. Small streams in the islands of Negros, Tanhay, Siquijor; Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—The last whorl being angular gives this species a peculiar and remarkable character, and causes a channel immediately below the suture. Several of the specimens under examination have beautiful delicate impressed lines immediately above the sutures. In the superior whorls these lines cover the whole surface. The folds

terminate on the angle, and are disposed to be nodulous there. The aperture is rounded, angular above, and not quite one-third the length of the shell. The base of the shell is rounded.

MELANIA RECTA. *M. testá plicatá, attenuatá, subcrassá, tenebrosocastanée; spirá valde elevatá; suturis irregulariter impressis, subcanaliculatis; anfractibus tredecim, subplanulatis; plicis numerosis; aperturá parvâ, ovatâ, ad basim rotundâ, intus cærulescente; columellâ incurvâ.*

Hab. Very small streams, Siquijor and isle of Negros, Philippines. Length 1·7, diam. ·5 of an inch.

Remarks.—In many of its characteristics this species is like the *M. costellaris*. It differs entirely, however, in the enlargement of the last whorl, the angle on the superior part of it, and in the channel below the suture, which are important characters in the *costellaris*. Nor has it the minute revolving lines. The folds are remarkably regular and distinct, and number about eleven on each whorl in the eight specimens under examination. On two individuals the epidermis remains quite perfect, and is deposited in regular, revolving striæ. The aperture is about one-third the length of the shell; it is rounded below and angular above, where it is slightly set off from the body of the whorl. The columella is but slightly curved.

MELANIA AUSTRALIS. *M. testá plicatâ, conicâ, tenui, diaphand, rubiginoso-corned; spirâ costatâ, prope apicem turbinatâ; suturis impressis; anfractibus septem, convexis, ad basim striatis; plicis numerosis; aperturâ magnâ, ellipticâ, intus salmoniâ; columella tortâ; labro supernè emarginato.*

Hab. Victoria river, North Australia.

Length ·9, diam. ·4 of an inch.

Remarks.—This is a very distinct little species, and the sudden enlargement of the third whorl below the apex gives it a somewhat turbinated appearance. The folds do not on the lower whorl reach the suture, and above and below these folds there are minute revolving striæ. The aperture is more than one-third the length of the shell. The outer lip is slightly crenulate and remarkably incurved near to its junction with the body whorl.

MELANIA TORNATELLA. *M. testâ plicatâ, fusiformi, crassâ, corned, infernè lineatâ; spirâ acuminatâ; suturis irregulariter impressis; anfractibus novem, convexiusculis, ad apicem mucronatis, in medio concavis; plicis numerosis, crebris; aperturâ constrictâ, elongatâ, intus albâ; labro supernè incisâ; columellâ lævi, crassâ, contortâ, reflexâ.*

Hab. Shallow rivers, Tanhay, isle of Negros, Philippines.

Length ·9, diam. ·35 of an inch.

Remarks.—This belongs to a very remarkable group of *Melania*. The emargination of the outer lip, above the middle of the whorl, is strikingly characteristic of the group. It causes a slight flatness or convexity of the whorl, as well as a curve in the numerous ribs, which cover the whole surface in this species, except where it is superseded

by the transverse lines on the lower part of the whorl. These lines are remarkably parallel, regular and well-impressed, and in the four specimens under examination are six in number. The folds are like ribs, very numerous, closely set, and very distinct. The form of this species, described above, is very like *Tornatella*, and the twist in the columella also resembles that genus. The ribs continue on the apex and give it a scalariform appearance. The aperture is nearly one-half the length of the shell. The edge of the lip, below the emargination, is slightly crenulate. The columella is very thick towards and at the base, where it is so retuse as to permit the inside to be seen. One of the specimens is rubiginose at the base. No operculum accompanied the specimens.

MELANIA RUDIS. *M. testâ plicatâ, subfusiformi, crassâ, cornéâ; spirâ subelevatâ; suturis irregulariter impressis; anfractibus planulatis transversim lineis impressis cinctis, supernè canaliculatis; plicis numerosis, crebris; aperturâ parvâ, ovatâ, intus albidâ; labro supernè emarginato; columellâ lævi, subcrassâ, tortâ.*

Hab. Amboyna.

Length 1.1, diam. .4 of an inch.

Remarks.—Allied to *Melania tornatella*, it forms one of the emarginate group, but differs in the size of the aperture and in the form of the ribs, which are transversely cut by numerous fine lines, in groups, which lines traverse the whole whorls. The aperture is about one-third the length of the shell, and the lip is crenulate. The three specimens under examination are all truncate at the apex, and the number of whorls therefore not ascertained. It has the spiral operculum usual to *Melania*.

MELANIA MICROSTOMA. *M. testâ plicatâ, subfusiformi, subcrassâ, luteo-cornéâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus octo, planulatis, transversim lineis impressis cinctis, supernè canaliculatis; plicis numerosis, crebris; aperturâ maximâ, ovatâ, ad basim truncatâ, intus cærulescente; labro supernè emarginato; columellâ lævi, ad basim subcrassâ tortâque.*

Hab. Mountain streams, islè of Negros, Philippines.

Length .9, diam. .3 of an inch.

Remarks.—This belongs to the group with emarginate lip, along with *M. rudis* and *M. tornatella*. It is a more slender species, more subulate, and has a smaller aperture than either. It takes more the form of *Terebra*. It has groups of lines which decussate the ribs as in the *rudis*. The aperture is not one-third the length of the shell, and the lip is crenulate. No operculum was received with the shells.

MELANIA TRANSVERSA. *M. testâ plicatâ, pyramidatâ, crassâ, cornéâ, castaneo-maculatâ; spirâ elevatâ; suturis irregulariter impressis; anfractibus subconvexis, transversim lineis impressis cinctis; costellis verticalibus raris; aperturâ parvâ, obliquè transversâ, rhomboideâ, intus maculatâ et cærulescente; labro terebræformi, crenulato; columellâ contortâ, supernè incrassatâ, infernè emarginatâ.*

Hab. Guiana.

Length 1.6, diam. .5 of an inch.

Remarks.—This species is remarkable for the unusual obliquity of its aperture and its auger-shaped lip. In its ribs and decussate striæ it resembles the group consisting of *M. tornatella*, *M. rudis* and *M. microstoma*, but it has not the emarginate lip and therefore does not belong to them. The emargination at the base of the columella is quite a different character, and is very remarkable in this species, representing as it does the bite of the auger. The chestnut-coloured spots are small, but so distinct as to mark the interior of the shell, which is white and thick. The two specimens under examination are both truncate at the apex, and the number of whorls not ascertained, probably about ten. The aperture is rather more than one-fourth the length of the shell. The operculum is spiral, with the polar point nearly in the centre and with at least five revolutions, which is unusual with *Melaniæ*. It is allied to *M. truncata*, Lam. (*semiplicata*, Fer.), but is less cylindrical and differs somewhat in the aperture.

MELANIA MAXIMA. *M. testâ striatâ, elevato-conoïdæ, crassâ, corned; spirâ valdè elevatâ; suturis linearibus; anfractibus duodecim, planulatis; striis magnis, raris, tenebrosis; aperturâ magnâ, rhomboidæ, intus albidâ; columellâ valdè contortâ.*

Hab. Copan, Central America.

Length 3, diam. 1.1 inches.

Remarks.—This very large species has a remarkable outline, forming a perfectly regular, rather obtuse cone above. The aperture is very large, and in the youngest of the three specimens the coloured striæ are very distinct within. Under the microscope minute revolving lines may be observed over all the whorls. The aperture is rather more than one-third the length of the shell. The operculum has five revolutions and is very much like that of *M. transversa*, the polar point being nearly central.

MELANIA MINDORIENSIS. *M. testâ striatâ, elevato-conoïdæ, subtenui, pallidâ, ad apicem acuminatâ; spirâ elevatâ; suturis impressis; anfractibus duodecim, subconvexis, striis crebris; aperturâ magnâ, ellipticâ, intus albâ; columellâ incurvatâ tortâque.*

Hab. Small streams, Puerto Galero, isle of Mindoro, Philippines.

Length 1.9, diam. .7 of an inch.

Remarks.—The outline of this species is very regular, tapering to a fine point. There are five specimens under examination, all of which have raised striæ over the whole of the body whorl. Some of the specimens have the two next whorls ribbed, which ribs, the striæ decussating, form granular elevations. The remaining whorls are perfectly smooth, with a few delicately impressed transverse lines. Some have brown spots, which towards the apex are more numerous and flammate. The aperture is more than one-third the length of the shell. The operculum has its polar point on the lower edge, and the curved lines of growth do not make one-eighth of a revolution.

MELANIA INDEFINITA. *M. testâ striatâ, elevato-conicâ, sub-*

crassd, tenebroso-corned; spirâ subelevatâ; suturis valde impressis; anfractibus convexis, infra suturas impressis, striis crebris impressis; aperturâ parvâ, ovatâ, intus cærulescente, ad basim rotundâ; columellâ regulariter incurvatâ.

Hab. Naga, Luzon, Philippines.

Length 1.6, diam. .5 of an inch.

Remarks.—The species has a very close resemblance to the striate varieties of *M. Virginica*, Say. The three adult specimens under examination are truncate, and the number of whorls therefore not ascertainable, but probably about nine. The impressed revolving lines are somewhat distant, regular and delicate. Between these, under the microscope, may be seen very minute revolving striæ. The aperture is about one-fourth the length of the shell. The operculum has its polar point near to the edge of the lower margin.

MELANIA LUZONIENSIS. *M. testâ striatâ, conicâ, subtenui, tenebroso-corned; spirâ erodâ; suturis impressis; anfractibus sex, convexiusculis, transversim lineis rugosis impressis cinctis; aperturâ magnâ, elongato-ellipticâ, intus rubiginosâ; columellâ albâ tortâque.*

Hab. Small streams, Calanang, province of Bai, Philippines.

Length 1.1, diam. .5 of an inch.

Remarks.—There is no peculiarity in the outline of this species, and the most striking character is perhaps in the impressed lines, which are somewhat distant, having minute numerous wrinkles across the groove. They are very distinctly visible under the microscope, and do not seem to have been observed in any other species. The superior part of the whorls is disposed to be granose, and one specimen has four rows of granules. Immediately under the sutures there is a yellow line. The aperture is one-half the length of the shell. The operculum has its polar point close to the lower margin.

MELANIA ALBESCENS. *M. testâ striatâ, elevato-conicâ, subtenui, albidâ, lineis rufis interruptis ornatâ; spirâ acuminatâ; suturis impressis; anfractibus undecim, planiusculis, lineis transversis vix impressis; aperturâ ovato-oblongâ, intus albidâ, rufo-maculatâ, ad basim rotundâ; columellâ incurvâ.*

Hab. Small streams, isles of Guimaras, Negros and Siquijor, Philippines.

Length 2.5, diam. .9 of an inch.

Remarks.—This is a very regularly formed and graceful species, with rather a high and tapering spire. The impressed revolving striæ are chiefly on the body whorl. The most striking characteristic is the numerous interrupted delicate brown lines, which cover nearly the whole of the whorls and are closer and better defined towards the apex. In some specimens there are beautiful brown spots on a white ground, below the sutures. The aperture is about one-third the length of the shell. The operculum has its polar point close to the lower margin on the left. There is a very great difference in the size and thickness of the specimens. Some of the old are very large, heavy, and covered with the oxide of iron, showing

beneath a brown epidermis and white nacre. In these the peritreme is very thick, and the columella more remarkably thick than heretofore noticed in any *Melanian*.

MELANIA HASTULA. *M. testâ striatâ, nonnunquam plicatâ, elongatè subulatâ, diaphanâ, tenui, fuscâ, striis transversis crebris costulas decussantibus; spirâ acuminatâ; suturis linearibus; anfractibus plano-convexis; aperturâ parvulâ; ovatâ, intus vel fuscâ vel albâ; columellâ incurvâ tortâque.*

Hab. Various streams of Siquijor, Cagayan, Mindanao, and other Philippine Islands.

Length 3·3, diam. ·8 of an inch.

Remarks.—A very attenuate and greatly varied species, some being smooth with few striæ, others with striæ over the whole surface, and others again with numerous folds. In some of the specimens under examination the apex is eroded in a very unusual manner, the outer portion of the whorls there being so much decomposed as to present little more than the central column. Some of the specimens are dark brown, others are horn-colour with brown spots. There are probably about twelve whorls. Although some of the specimens have more or less distinct, somewhat distant folds, there are others which have no folds whatever. This species is placed among the striate group, as striæ are found more or less developed on every specimen. The striæ immediately below the suture are more deeply impressed and cause a slight groove. A variety from Camiguin is flatter on the whorls and less disposed to plication. The aperture is not quite one-fourth the length of the shell, is rather open and somewhat patulous below. The operculum has its polar point near to the margin on the left.

MELANIA JUNCEA. *M. testâ striatâ, elongatè subulatâ, tenui, tenebroso-fuscâ, infra suturas luteo-lineatâ; spirâ attenuatâ; suturis valdè impressis, anfractibus undecim, convexis, lineis transversis impressis; aperturâ parvulâ, ovatâ, intus fuscâ; columellâ valdè incurvâ contortâque.*

Hab. Lake of Taal, province of Batanos, and small streams in Luzon, Philippines.

Length 2, diam. ·5 of an inch.

Remarks.—An attenuate and gracefully formed species. Some of the specimens are of a dark rich brown, others are flammate. Two have very small incipient folds on nearly all the whorls, others have a few towards the apex. From the same locality are four specimens, which, while they differ but little in form, are very different in colour, being yellowish, with longitudinal flammate brown marks. This variety answers very closely to *M. flammulata*, Von dem Busch, 'Conchylien,' &c. by Dr. Philippi, tab. 1. fig. 3, 4. The aperture is about one-fourth the length of the shell and is rather small, with a patulous lip having a whitish border. The operculum has its polar point rather near to the margin. Gualtierus (tab. 6. fig. G) gives a drawing of a freshwater shell closely resembling this variety. Another variety is rather thinner, diaphanous, horn-colour, and obscurely maculate.

MELANIA CONULUS. *M. testâ minute et creberrimè striatâ, conicâ, subtenui, fuscâ; spirâ obtusâ; suturis linearibus; anfractibus septem, planulatis, uno-vittatis; aperturâ elongato-ovatâ, ad basim angulatâ, intus fuscâ; columellâ tortâ.*

Hab. Small streams, Fernando Po, West Africa.

Length 1.4, diam. .5 of an inch.

Remarks.—This interesting species is remarkable for its peculiar striae, which cover the whole surface of all the whorls. The lines are irregular, and so minute as to require the microscope to detect them. A little above the middle of the whorl there is an obscure, dark, rather broad band. The middle of the whorl is somewhat angular. The aperture is not quite one-half the length of the shell, and is somewhat angular below.

MELANIA OBRUTA. *M. testâ striatâ, conoideâ, crassâ, bivittatâ, fuscâ; spirâ subelevatâ; suturis impressis; anfractibus septem, convexiusculis, lineis crebris elevatis; aperturâ parvâ, subpatulâ, intus albâ et bivittatâ, ad basim emarginatâ et retusâ; labro crenulato et arcuato.*

Hab. —?

Length 1.3, diam. .5 of an inch.

Remarks.—In general form and outline this species is very like to the striate variety of *M. Virginica*, Say. It differs in being thicker and in having a crenulate and patulous lip. In the four specimens submitted, the two dark brown bands are beautifully distinct inside, and stop short of the margin. Three specimens have a suddenly enlarged body whorl. Two of the specimens have obscure, longitudinal brown marks. The aperture is about one-third the length of the shell, is very much curved on the edge of the lip, and disposed to be canaliculate at the base. The striae are coarse and elevated.

MELANIA TURRICULUS. *M. testâ striatâ, conoideâ, subtenui, obscurè maculatâ, cornâ, spirâ subelevatâ; suturis impressis; anfractibus novem, convexiusculis, lineis subraris impressis, superne angulatis; aperturâ parvâ, subconstrictâ, intus albidâ et obscurè maculatâ, ad basim rotundâ; columellâ regulariter curvatâ.*

Hab. Small rivers, Calanang, province of Bai, Luzon, Philippines.

Length 1.2, diam. .4 of an inch.

Remarks.—This species, like *M. obruta*, resembles in size and outline very closely *M. Virginica*, Say. It differs from the former in being less thick, in being maculate and not banded, and in having impressed lines. It differs from the latter in being maculate, and in being angular immediately under the suture. The aperture is rather more than one-third the length of the shell, angular above and rounded below. The operculum has its polar point somewhat removed from the lower margin.

MELANIA APIS. *M. testâ striatâ, conicâ, tenui, obscurè granosâ, rufo-castaneâ; spirâ obtusâ; suturis irregulariter impressis; anfractibus convexis, lineis paucis elevatis; aperturâ parvâ, sub-*

rotundā, intus rufā, ad basim angulatā; labro repando, rufo-marginato; columellā incrassatā.

Hab. Marshy places, Vera Cruz, Mexico.

Length .8, diam. .3 of an inch.

Remarks.—Neither of the four specimens under examination are perfect, all being much eroded at the apex. Under the microscope the surface may be observed to be papillose, a character rarely found in this genus, though not very uncommon in *Helix*. The aperture is rather more than one-third the length of the shell and is unusually rotund. The rufous line surrounds the peritreme. The aperture is reddish inside.

MELANIA CUMINGII. *M. testā striatā, turritā, supernè unocarinatā, subcrassā, tenebroso-fuscatā; spirā valdè elevatā; suturis regulariter impressis; anfractibus planulatis, lineis raris impressis; aperturā magnā, subtriangulārī, intus cærulescente; columellā retusā contortāque.*

Hab. Very small streams, island of Siquijor, Philippines.

Length 2.5, diam. .7 of an inch.

Remarks.—This is a very remarkable species. A single specimen only was sent by Mr. Cuming, and this unfortunately is by no means perfect. There is a good deal of ferruginous matter deposited over the surface, and the apex is so much eroded that the number of whorls cannot be well ascertained, perhaps about nine. The turritid form of the shell is very notable. Immediately under the suture there is an elevated and cordlike line, slightly angular on the superior part. Below this the whorl is slightly impressed. Part of the surface is wrinkled by the transverse striæ decussating longitudinal lines. The aperture is about one-third the length of the shell, and remarkable for its triangular form. The columella is unusually white, which shows in contrast with the dark epidermis. The operculum is large and thick, having its polar point near to the lower border.

MELANIA DACTYLUS. *M. testā striatā, valdè elevatā, supernè costatā, crassā, vel fuscā vel luteo-corned; spirā valdè elevatā; suturis impressis; anfractibus duodecim, convexis, lineis crebris elevatis ornatis; costellis verticalibus crebris; aperturā submagnā, subrotundatā, intus vel salmonid vel cæruleā; columellā incrassatā, salmonid tortāque.*

Hab. Small streams in Guimaras, Mindanao, Luzon and Seyte, Philippines.

Length 3.2, diam. 1 inch.

Remarks.—This is a remarkably fine, large, and protean species. There are about two dozen specimens under examination from various islands of the Philippines. The prevailing character of the surface is striate with decussating costæ on the superior whorls; but some specimens have these costæ enlarged on the lower whorls, instead of their having vanished, as on others. Some again have their costæ rising into a series of pointed tubercles. Under the microscope many numerous minute striæ may be observed to revolve parallel with the coarser ones. Another variety is quite smooth on the upper whorls,

with fewer striæ and costæ. This looks like an immature shell. The aspect of these three varieties is quite different, but I do not consider it safe to separate them into species. The aperture is rather more than one-fourth the length of the shell. The operculum is large, having several revolutions, and the polar point is near to the centre.

MELANIA CRENIFERA. *M. testâ granulâtâ, acuto-conicâ, subfusiformi, subtenui, corned; spirâ granulâtâ, acuminâtâ; suturis irregulariter impressis; anfractibus novem, convexiusculis, ad basim striatis; aperturâ submagnâ, ovatâ, intus albâ; columellâ albâ tortâque.*

Hab. Small river in Java.

Length .9, diam. .4 of an inch.

Remarks.—Three specimens under examination are all nearly covered with granules, a fourth has but few. It is a very symmetrical little species. The aperture is rather more than one-third the length of the shell. No opercula accompanied these specimens.

MELANIA NANA. *M. testâ granulâtâ, conicâ, fusiformi, tenui, diaphanâ, vel corned vel fuscâ, rufo-maculatâ; spirâ depressâ, granulâtâ; anfractibus sex, subplanulatis, ad basim striatis; suturis irregulariter impressis; aperturâ magnâ, ellipticâ, intus vel albâ vel fuscâ; columellâ tortâ.*

Hab. Mountain streams, isle of Negros, Philippines.

Length .6, diam. .3 of an inch.

Remarks.—The colour varies in this species owing to the number of brown spots, which differ much in different specimens. One of those under examination is horn-coloured, with a few distinct brown spots; another is quite dark in consequence of the multiplicity of them. The largest granules are immediately below the suture, and the line there is disposed to be of lighter colour. The aperture is about one-half the length of the shell.

MELANIA TESSELLATA. *M. testâ granulâtâ, elevato-conicâ, crassâ, tenebroso-fuscâ; spirâ elevatâ, crebrè granulâtâ; anfractibus planulatis, ad basim striatis; suturis irregulariter impressis; aperturâ parvâ, ellipticâ, constrictâ, crenulatâ, intus tricotatâ, ad basim canaliculatâ; columellâ subrectâ.*

Hab. —?

Length 1.10, diam. .4 of an inch.

Remarks.—There is nothing striking in the general appearance of this shell; but in looking into the interior, there will be observed a character which has not been known to exist in any other species—three elevated, revolving ribs, terminating short of the outer lip. The columella is simple, nearly straight, and ends in the angle at the sinus. These remarkable ribs may involve a difference of organic structure of the animal, in which case a new genus would be required for this species. One of the three specimens is entirely white inside, the other two have dark bands. The apex being eroded in them all, the number of whorls cannot be ascertained, probably about nine. The aperture is about one-third the length of the shell. The operculum has its polar point near to the lower margin.

MELANIA CREBRUM. *M. testâ cancellatâ, elevato-conicâ, crassâ, tenebroso-castaneâ; spirâ valdè elevatâ; anfractibus decem, convexiusculis, ad basim striis impressis; suturis impressis; aperturâ parvulâ, ovatâ, intus albidâ; ad basim rotundâ; columellâ incurvatâ.*

Hab. Small streams, Guimaras, Philippines.

Length 1·5, diam. ·5 of an inch.

Remarks.—The symmetry of the outline and the extreme regularity of the decussating lines over the whole of the whorls, except at the base, are distinguishing characteristics of this species. The elevated portions between the decussating lines are quadrangular and resemble brickwork. The four specimens submitted are all “dead shells,” and are partly decomposed towards the apex. The aperture is rather more than one-fourth the length of the shell.

MELANIA RETICULATA. *M. testâ cancellatâ, conicâ, crassâ, pallidâ; spirâ elevatâ; anfractibus septem, planulatis, crassè cancellatis, ad basim striatis; suturis impressis; aperturâ magnâ, trapezoided, ad basim angulatâ, intus albd; columellâ incurvatâ, contortâque.*

Hab. China.

Length 1·8, diam. ·7 of an inch.

Remarks.—This is a very remarkable and distinct species, covered all over, except the lower part of the base whorl, with coarse, somewhat distant decussating striæ, which rise into nodes and form quadrangular areas. Altogether it is a rough *Cerithium*-looking species. The epidermis is remarkably thin and light-coloured, the upper portion of the spire being quite white in the two specimens under examination. The aperture is more than one-third the length of the shell.

MELANIA ACULEUS, Lea. *M. testâ lævi, nonnunquam striatâ vel granulâtâ, elongatè subulatâ, crassâ vel subcrassâ, corned vel fusco-nigricante; spirâ acuminatâ; suturis linearibus; anfractibus planulatis; aperturâ ovatâ, intus cærulescente; labro expanso.*

Hab. Siquijor, Naga, Cagayan, and others of the Philippines.

Length 2·6, diam. ·7 of an inch.

Remarks.—When this species was described by J. Lea in 1832 (*Trans. Am. Phil. Soc.*), he had seen but a single specimen, which had neither granules nor striæ. Among the large quantity of this genus taken by Mr. Cuming in his Eastern voyage, were about forty specimens of this singularly protean species. Were there but few, and these as different as many of them are, no one would hesitate to consider them as distinct species. But the large number and extraordinary difference in them enables one, or rather compels one to keep them in a group as curious divergent varieties. When we compare the large smooth variety with the small variety covered with granules, it is difficult to believe that they may have come from a common parent, but the *nuance* is too complete in the series to admit of a doubt.

It was deemed advisable to re-describe this species, so that it might
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embrace the various forms which it takes in the specimens now submitted by Mr. Cuming from various localities.

MELANIA DIADEMA. *M. testá spinosá, acuminato-ovatá, transversim lineatá, subpapyraceá, diaphaná, pallio lutescente; spirá scalariformi, acutá; suturá lineatá; anfractibus octo, supernè angulatis, planis supra et infra; angulo spinis instructo; spinis magnis, crebris, regularibus, brevibus, eversis, aliquando decurrentibus; lineis transversis, minimis, decussatis; anfractu ultimo bullato, ad basim lineato; aperturá magná, ovatá; columellá albidá, incurvá; epidermide hispidá.*

Hab. Small streams, isle of Guimaras, Philippines.

Length 1·4, diam. ·8 of an inch.

Remarks.—Differs from *M. amarula* in the thinness of its substance, and regularity and closeness of its spines, which are all bent outwards, at a regular angle.

MELANIA CORNUTA. *M. testá spinosá, elongato-ovatá, crassá, fuscescente vel viridescente; spirá exsertá, scalariformi, apice truncatá; suturá lineari; anfractibus medio angulatis, supernè subconcavis; angulo spinis instructo; spinis magnis, brevibus, incurvis, raris, acutis, basi latissimis, distortis, decurrentibus, anticè canaliculatis; anfractu ultimo magno, ad basim transversim striatulo; aperturá magná, ovatá; columellá lucted.*

Hab. Madagascar.

Length 1·5, diam. ·9 of an inch.

Remarks.—The spines are short, stout, and irregularly bent, presenting the appearance of horns, and distinguishing the shell from *M. amarula*, which it otherwise somewhat resembles.

MELANIA ACANTHICA. *M. testá spinosá, ovato-turritá, varicosá, transversim lineatá, subtenui, fuscá; spirá elongatá, conicá, scalariformi; apice truncatá; suturá lineari; anfractibus supernè angulatis, varicibus distortis; angulo spinis instructo; varicibus magnis, regularibus, subobliquis, supernè in spinis productis; spinis longis, tenuibus, irregularibus, extortis; lineis transversis, crebris, parvis, subalternantibus; anfractu ultimo parvo, ad basim lineato; aperturá ellipticá, infernè effusá; labro infernè producto; columellá parvá, infernè incrassatá.*

Hab. Manilla and isle of Negros, Philippines.

Length ·8, diam. ·4 of an inch.

Remarks.—Bears some resemblance to *M. scabra*, Férussac, and *M. bellicosa*, Hinds.

MELANIA ZEYLANICA. *M. testá lævi, ovatá, crassá, nitidá, albidá aut virido-fuscá; badio flammulatá, spirá brevi, acuminatá, apice acutá, aliquando erodá; suturá lineari; anfractibus quinque, convexis, ad suturam superiorem impressis, maculis flammulatis aut sagittatis badiis; anfractu ultimo magno, bullato; basi lævi; aperturá ovato-rotundá, supernè angulatá, infernè rotundatá, intus albidá; columellá magná, albá, supernè incrassatá, infernè curvatá.*

Hab. Seychelles and Ceylon.

Length .9, diam. .6 of an inch.

Remarks.—The markings are very variable, being sometimes oblique, zigzag lines, extending over the whole surface of the whorls, sometimes sagittate or short zigzag spots in transverse series. Indeed some specimens are of a uniform dark green. The last whorl sometimes has two impressed transverse lines. The mouth is nearly two-thirds the length of the shell.

MELANIA POLYGONATA. *M. testâ tuberculatâ, elevato-conicâ, striatâ, crassâ, nigrâ; spirâ elevatâ, conicâ, apice erosâ; suturâ pæne obsoletâ, flexuosâ; anfractibus supernè et infernè striatis; medio angulatis; angulo serie unicâ tuberculorum instructo; tuberculis maximis, transversè angulatis, lævibus; striis transversis raris; anfractu ultimo magno; basi crebrè striatâ; aperturâ supernè valde acutâ, infernè productâ et effusâ, intus albidâ; columellâ albd, flexuosâ; operculo parvo, subcentrali.*

Hab. Copan, Central America.

Length 3.5, diam. 1.3 inch.

Remarks.—One of the largest and finest of the *Melaniæ*. The upper whorls are generally covered with a thick, smooth deposit, obliterating the sculpture. On them the tubercles appear to degenerate into elevated costæ. The operculum is much smaller than the mouth. The tubercles and striæ sometimes produce brown marks on the columella and inside the aperture.

MELANIA DENTICULATA. *M. testâ spinosâ, ovato-turritâ, transversim striatâ, denticulatâ, tenui, diaphanâ, ferruginè, maculis badiis minutis linearibus; spirâ exsertâ, conicâ, scalariformi, apice acuminatâ; suturâ lineari; anfractibus septem, supernè angulatis, angulo denticulatis; denticulis parvis, acutis, obliquis; striis transversis, parvis, alternantibus, rugosis, maculatis, lineolis longitudinalibus minutissimis decussatis; anfractu ultimo parvo, ad basim striato; aperturâ ovatâ, infernè effusâ; columellâ flexuosâ, tenui.*

Hab. Mountain streams, isle of Negros, Philippines.

Length .6, diam. .3 of an inch.

Remarks.—Allied to *M. spinulosa*, Lam., but may be distinguished by its abrupt denticulations.

MELANIA ARMILLATA. *M. testâ cancellatâ, ovato-turritâ, crassiusculâ, graniferâ, viridescenti; spirâ elevatâ, subovatâ, apice acutâ; suturâ parvâ, crenatâ; anfractibus undecim, planatis, propè suturam superiorem angulatis, supernè albidis, costis longitudinalibus obliquis graniferis crebris; granulis rotundatis, albidis; anfractu ultimo supernè compresso, infernè subturgido; basi transversè striatâ; aperturâ ovatâ, supernè acutè angulatâ, infernè rotundatâ et effusâ; labro infernè producto; columellâ infernè angulatâ, supernè rectâ.*

Hab. India.

Length 1.4, diam. .5 inch.

Remarks.—Immediately below the angle of the whorls there is

apt to be a larger series of granules, with a very small one succeeding it.

MELANIA COCHLEA. *M. testâ subspinosâ, turritâ, costatâ, striatâ, tenui, fulvâ, maculis badiis; spirâ scalariformi, ovato-acuminatâ, apice acutâ; suturâ lineari; anfractibus decem, infernè subconvexis, supernè angulatis et concavis; costis obliquis, longitudinalibus, anfractuum in angulo elevatis et acutè mucronatis, supernè vix obsoletis; striis transversis, minutis, aliquando obsoletis; anfractu ultimo parvo, ad basim striato; aperturâ ovatâ, supernè acutâ, infernè effusâ.*

Hab. —?

Length 1', diam. .4 of an inch.

Remarks.—On the last whorl of the only specimen submitted, the costæ are almost obsolete. The striæ are strongest near the sutures, and scarcely visible at the middle of the whorls.

MELANIA LATERITIA. *M. testâ cancellatâ, acutè ovatâ, compressâ, crassiusculâ, striatâ, graniferâ, albidâ, virido-fusâ, rufo fasciatâ aut atrâ; spirâ elevatâ, plerumque scalariformi, apice acutâ aut erodâ; suturâ impressâ, crenatâ; anfractibus decem, planatis, supernè angulatis, supra angulum sæpe albidis; striis transversis crebris graniferis; granulis quadratis, abruptis, planatis, seriebus longitudinalibus positis; anfractu ultimo magno, subcompresso; basi graniferâ; aperturâ ovatâ, supernè acutè angulatâ et sinuatâ, infernè latâ, expansâ et retusâ, internè sæpe fasciatâ; columellâ contortâ; operculo parvo, ovato.*

Hab. Philippines.

Length 1.6, diam. .7 of an inch.

Var. α. *Anfractibus supernè graniferis, infernè striis transversis impressis; basi vix lævi, striis raris.*

Var. β. *Striis graniferis alternantibus.*

Remarks.—A very variable species as to size, colour and sculpture. The operculum differs much in some individuals in both its shape and apex. This shell bears some resemblance to the *M. granifera*, Lam. Its most remarkable characteristic is its square, flattened granules, bearing some resemblance to brickwork.

MELANIA MODICELLA. *M. testâ lævi, ovato-conicâ, crassâ, nitidâ, virido-fusâ; spirâ conicâ, brevi, apice acutâ, sæpe erodâ; suturâ lineari; anfractibus quinque, convexis, rapidè crescentibus, prope suturam superiorem depressis, prope suturam inferiorem striis parvis transversis duabus aut tribus; anfractu ultimo magno, medio striis tribus, basi lævi; aperturâ ovato-rotundâ, supernè subangulatâ, infernè subeffusâ, intus albidâ; labro acuto; columellâ lacteâ, curvatâ; operculo ovato, subcentrali, concentrico.*

Hab. Timor.

Length .7, diam. .5 of an inch.

Remarks.—This shell and the *M. zeylanica* may perhaps be taken as the types of a new genus or subgenus. Further investigation with respect to the animal may decide; in the meantime, the name of

RIVULINA is proposed provisionally. The general outline and operculum are those of the PALUDINA. In old specimens the peritreme of the mouth is continuous, but there is only a slight depression behind the columella in place of an umbilicus. The upper whorls are occasionally faintly lined or spotted with brown.

MELANIA PAGODA. *M. testâ spinosâ, turritâ, costatâ, transversim striatâ, tenui, diaphanâ, cornâ, maculis badiis minutis linearibus; spirâ elongatâ, subovatâ, acuminatâ, scalariformi; suturâ lineari; anfractibus decem, supernè angulatis et subconcavis, angulo spinulosis; costulis obliquis longitudinalibus, infernè obsoletis, supernè in spinulas aut denticula eversa productis, in anfractibus superioribus creberrimis et magnis, inferioribus minoribus rarioribusque; striis transversis, parvis, crebris, alternantibus, maculatis, lineolis longitudinalibus decussatis; anfractu ultimo usque ad basim striato; aperturâ ovatâ, supernè acutâ, infernè effusâ.*

Hab. Isle of Guimaras, Philippines.

Length 1.4, diam. .6 of an inch.

Remarks.—A beautiful little species, with irregular spines, very strongly marked on the upper whorls, but which sometimes diminish to denticulations on the lower. It can be mistaken for none of its congeners, except perhaps the *M. cochlea*.

3. DESCRIPTION OF FIVE NEW SPECIES OF ANODONTÆ, COLLECTED BY H. CUMING, ESQ. IN THE EAST INDIES. BY ISAAC LEA.

ANODONTA GRACILIS. *A. testâ latâ, subcylindraceâ, inæquilateralî; valvulis tenuibus; natibus subprominentibus; epidermide luteâ; margaritâ vel albâ vel purpureâ.*

Hab. Dingle, Isle of Panay.

Diam. 1; length 1.7; breadth 3.4 inches.

Remarks.—This species is more cylindrical than is usual with the *Anodontæ*, and differs from the other species taken by Mr. Cuming in this character: it is rounded anteriorly, and is subangular posteriorly. The dorsal margin is nearly straight, the basal margin is slightly emarginate, the disc being disposed to be flattish. In the specimens under examination, the beaks are all more or less eroded, but in the youngest there are slight indications of undulations. The ligament is thin and long; the marks of growth are distant and rather dark, and the epidermis in the young is yellow or greenish, in the older it is darker and brown; the anterior cicatrices are distinct; the dorsal small, and placed in the cavity of the beaks.

The five species herein described are remarkable in the character of the dorsal line, which rises immediately under the margin into a dentoid line, somewhat lamellar, and approaching in its character the more distinct tooth of the genus *Dipsas* (Leach). In the younger specimens this is much more distinctly marked, and in the older it becomes obsolete. This group of *Anodontæ*, having this dentoid character, would seem to form a natural connexion on one side with

the genus *Dipsas*, and on the other with the genus *Unio*, connecting with *U. Bengalensis*, brought by Dr. Burrough from India, and described by me in the 'Trans. Am. Phil. Soc.' vol. vi. pl. 2. fig. 3. This peculiar form of tooth, if it may so be called, is peculiar to that part of the world, so far as my observation extends; for among the numerous species examined by me from Europe, Africa and America, South as well as North, I have never met with this character developed as in those alluded to above.

ANODONTA CREPERA. *A. testá ellipticá, subcompressá, inæquilateralí; valvulis tenuibus; natibus subprominentibus; epidermide tenebroso-fuscá; margaritá vel albá vel purpureá.*

Hab. Bongabon, Luzon, Philippines.

Diam. 1.1; length 1.8; breadth 3.3 inches.

Remarks.—Five of the six specimens under examination are purple, the sixth whitish. The outline is nearly oval. One of the specimens is obtusely biangular posteriorly; the substance of the shell is slightly thickened anteriorly; the beaks are too much eroded to observe any undulations; the ligament is rather short and thin; anterior cicatrices distinct; dorsal cicatrices small, and placed in the centre of the cavity of the beaks. The species is closely allied to *A. tenuis*, but is not quite so thin and is more transverse. Three specimens of the young have a well-defined anterior lamellar tooth and a distinct posterior raised line, which in the left valve is slightly divided. This is so marked in these young specimens, that one would scarcely hesitate to place them among the *Uniones* if we had not the adult, which have scarcely a vestige of the elevation on the dorsal line.

ANODONTA TENUIS. *A. testá ellipticá, compressá, inæquilateralí; valvulis pertenuibus; natibus subprominentibus; epidermide tenebroso-fuscá.*

Hab. Sual, Luzon, Philippines.

Diam. 1; length 1.7; breadth 3 inches.

Remarks.—This is very closely allied to *An. crepera* herein described, and may, perhaps, when more specimens of the old and young of both species are compared, prove only to be a variety. The specimens before me, however, differ in the *tenuis* being rather thinner and less elliptical, the outline inclining to oblong. The existence of teeth in the young, and the rudiments on the dorsal line in the adult, are very similar to the *crepera*. Of the four specimens before me, two have the nacre purple and two white. The beaks are too much eroded to observe any marks of undulations. The ligament is rather long and thin. Anterior cicatrices distinct; dorsal cicatrices small, and placed in the centre of the cavity of the beaks.

ANODONTA SUBCRASSA. *A. testá oblongá, subinflatá, subæquilateralí; valvulis subcrassis; natibus prominentibus undulatisque; epidermide luteo-fuscá; margaritá albidá, colore salmonis tinctá et iridescente.*

Hab. Laguna de Bai, Luzon, Philippines.

Diam. 1.2; length 1.7; breadth 2.9 inches.

Remarks.—It is rare to meet with an *Anodonta* of the thickness of this species, but it still is not so ponderous as the *arcuata*, Fer., or as *lato-marginata* (Nobis). It cannot be confounded with either of these species, not being arcuate, and not having compressed beaks like the former, and being oblong and thinner than the latter, as well as also being destitute of the broad margin. The substance of the shell is slightly thickened anteriorly, and the basal margin is emarginate; the beaks are submedial, and when perfect are beautifully ornate with numerous small folds which form an acute angle from the point of the beaks, nearly parallel to the line of the umbonal slope; the ligament is short and rather thick; anterior cicatrices distinct; dorsal cicatrices large, and placed in the cavity of the beaks. The colour of a single young specimen before me is salmon inclining to purple, and the adults have the cavity of the beaks tinted in this manner. In the young specimen the lamellar line on the dorsal margin is very well defined, in the adults this character is nearly obliterated.

ANODONTA CUMINGII. *A. testâ ellipticâ, compressâ, inæquilateralî; valvulis subcrassis; natibus vix prominentibus; epidermide atro-fuscâ; margaritâ albâ et iridescente.*

Hab. Malacca.

Diam. 1; length 1.9; breadth 3 inches.

Remarks.—This is an interesting species, and remarkable in the form of the dorsal line, which is thickened and raised immediately under the beak, where it is slightly incurved. This disposition to form a curve tooth reminds us of that group of *Naiades* which M. D'Orbigny discovered in the rivers of South America, and which comprise his genus *Monocondylæa*. In fact, this species forms a perfect link between the *Anodontæ* and his genus, and it is allied very closely to that species of this group which I described in the 'Trans. of the Am. Phil. Soc.' vol. viii. pl. 18. fig. 39, under the name of *Margaratina Vonderbuschiana*, from Java. The form of the tooth of the *M. Bonellii* also approaches to these. The anterior margin of the *Cumingii* is rounded, the posterior is somewhat biangular; the anterior cicatrices confluent; the dorsal cicatrices form a line across the cavity of the beaks. In all the four specimens under examination, the beaks are too much eroded to observe any undulations. An unusually dark line marks the course of the pallial impression.

4. NOTE ON TRAGELAPHUS ANGASII. BY MR. PROUDFOOT.

The skins which I exhibit to the Society are those of an old ram and of a young female Antelope, which I shot on the banks of the Mapoota River, about sixty miles above its embouchure into Delagoa Bay. This river flows through the country of Mankazana, king of the Mathlengas (or Cutfaces), which people call this animal *Inyala*.

It is also found on another river called Umcoozi, running into St. Lucie Bay in the territory of Umpanda, king of the Zoolu, but very rarely.

On the Mapoota the *Inyala* are more numerous, and occur in small troops, composed of one ram and four or five females with their young.

They are always found in the densest bush: they browse chiefly on shrubs, and resemble the Bush-buck in their general habits.

The average height of an adult male is within a third of an adult Koodoo, and very much above that of a Bush-buck.

The female has no horns, resembles a female Koodoo in form, and is rather smaller in size.

July 23, 1850.

W. Yarrell, Esq., V.P., in the Chair.

The following papers were read:—

1. ON NEW SPECIES OF BIRDS FROM AUSTRALIA.
By J. GOULD, F.R.S., F.Z.S. ETC.

On the present occasion I propose to characterize seven more of the novelties sent home by Mr. MacGillivray, Naturalist to H.M.S. 'Rattlesnake.' *Vide* Proceedings, 1849, p. 109.

TANYSIPTERA SYLVIA.

Bill and feet sealing-wax red; crown of the head, wings, and five lateral tail-feathers on each side blue; ear-coverts, back of the neck and mantle black; in the centre of the latter a triangular mark of white; rump and two middle tail-feathers pure white; all the under surface cinnamon-red.

Total length, 15 inches; bill, $1\frac{1}{2}$; wing, $3\frac{5}{8}$; lateral tail-feathers, 3; middle tail-feathers, $9\frac{1}{8}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

Remark.—About the size of *T. Dea*. Fine specimens are contained in the British Museum collection.

HALCYON (SYMA?) FLAVIROSTRIS.

Bill fine yellow, passing into brown at the tip; crown of the head, back of the neck, ear-coverts and flanks cinnamon-red; at the back of the neck a narrow, broken collar of black; throat and lower part of the abdomen tawny white; back and wings sordid green; rump and tail greenish blue.

Total length, 7 inches; bill, $1\frac{7}{8}$; wing, 3; tail, $2\frac{1}{2}$; tarsi, $\frac{1}{2}$.

Hab. Cape York, Northern Australia.

Remark.—Smaller, but nearly allied to the *Syma Tirotoro* of M. Lesson. Some specimens have the crown of the head black. Fine specimens are contained in the collection at the British Museum.

DRYMODES SUPERCILIARIS.

Lores white; immediately above and below the eye a black mark, forming a conspicuous moustache; crown of the head and upper surface reddish brown, passing into chestnut-red on the rump and six middle tail-feathers; remainder of the tail-feathers black, tipped with white; wings black, with the base of the primaries and the tips of the coverts white, forming two bands across the wing; throat and

centre of the abdomen fawn-white; chest and flanks washed with tawny; bill black; legs fleshy brown.

Total length, $8\frac{1}{4}$ inches; bill, $\frac{7}{8}$; wing, $3\frac{3}{4}$; tail, 4; tarsi, $1\frac{5}{8}$.

Hab. Cape York, Northern Australia.

Remark.—About the size of *D. brunneopygia*. Fine specimens in the British Museum collection.

CARPOPHAGA ASSIMILIS.

Head, throat and ear-coverts grey; all the upper surface, wings and tail golden green; wing-coverts with a spot of rich yellow at the tip, forming an oblique band across the shoulder; line down the centre of the throat, chest and abdomen rich purple; under wing-coverts, vent, thighs and under tail-coverts rich orange-yellow; basal portion of the inner webs of the primaries and secondaries purplish cinnamon.

Total length, 14 inches; bill, 1; wing, 7; tail, 6; tarsi, $\frac{3}{4}$.

Hab. Cape York, Northern Australia.

Remark.—Very similar to *C. magnifica*, but considerably less in all its admeasurements. Specimens in the British Museum.

CHLAMYDERA CERVINIVENTRIS.

Upper surface brown, each feather narrowly margined, and marked at the tip with buffy white; throat striated with greyish brown and buff; under surface of the shoulder, abdomen, thighs and under tail-coverts light pure fawn colour.

Total length, $11\frac{1}{2}$ inches; bill, $1\frac{1}{4}$; wing, $5\frac{3}{4}$; tail, 5; tarsi, $1\frac{5}{8}$.

Hab. Cape York, Northern Australia.

Remark.—Intermediate in size between *C. nuchalis* and *C. maculata*, and distinguished from both by the fine fawn colouring of the under surface. A specimen in the British Museum of the male, apparently somewhat immature.

NECTARINIA AUSTRALIS.

Crown of the head and upper surface olive-green; over and under the eye two very indistinct marks of yellow; throat and chest steel-blue; remainder of the under surface fine yellow; bill and feet black.

Total length, $4\frac{3}{4}$ inches; bill, $\frac{7}{8}$; wing, $2\frac{1}{8}$; tail, $1\frac{1}{2}$; tarsi, $\frac{5}{8}$.

Hab. Eastern coast of Australia.

Remark.—Differs from *N. frænata* in its larger size, in its straighter bill, and in the stripe of yellow over the eye being almost obsolete. Specimens in the British Museum.

MONARCHA LEUCOTIS.

Crown of the head, back of the neck, back, primaries and six middle tail-feathers black; the three lateral tail-feathers on each side black with white tips; lores, a broad mark over the eye, ear-coverts, sides of the neck, scapularies and upper tail-coverts white; throat white, bounded below with black, the feathers lengthened and protuberant; chest and abdomen light grey; bill and feet lead-colour.

Total length, $5\frac{3}{4}$ inches; bill, $\frac{5}{8}$; wing, $2\frac{3}{4}$; tail, $2\frac{3}{4}$; tarsi, $\frac{5}{8}$.

Hab. Cape York, Northern Australia.

Remark.—About the size of *M. trivirgata*. Specimens in the British Museum.

2. A MONOGRAPH OF MACROCHISMA, A GENUS OF GASTEROPODOUS MOLLUSCA BELONGING TO THE FAMILY FISSURELLIDÆ. BY ARTHUR ADAMS, R.N., F.L.S.

MACROCHISMA, Swainson.

Animal? Shell elongated, clypeiform, radiately ribbed, extremities elevated; foramen very large, elongated, placed near the hind part, with a groove posteriorly; the hind margin sinuated.

1. MACROCHISMA MAXIMA, A. Adams. *M. testâ oblongâ, costis parum elevatis subrugosis, striisque concentricis obsoletis ornatâ, fusco radiatim maculatâ, dorso elevatâ, lateribus planulatis, extremitate anticâ rotundatâ; posticâ elevatâ, subtruncatâ; foramen dilatatum, posticè excavatum.*

Hab. — ?

2. MACROCHISMA DILATATA, A. Adams. *M. testâ ovato-oblongâ, radiatim costatâ, rubrâ, albo variegatâ, utrinque rotundatâ, lateribus dilatatis; foramen oblongum, in medio angustatum.*

Hab. — ?

3. MACROCHISMA HIATULA, Swainson, Manual of Malacology, p. 356.

Fissurella macrochisma, Sow.

M. testâ ovato-oblongâ, radiatim costellatâ, fuscâ, subdepressâ, lateribus concavis, utrinque rotundatâ; foramen magnum, oblongum, posticè dilatatum, extremitate posticâ valdè elevatâ; margine vix sinuato.

Hab. — ?

4. MACROCHISMA COMPRESSA, A. Adams. *M. testâ angustè oblongâ, albidâ, roseo radiatim pictâ, costellis granulosis striisque concentricis decussatâ, utrinque rotundatâ, dorso convexâ, lateribus compressis, in medio inflexis, extremitate posticâ valdè elevatâ; foramen magnum, lanceolatum, posticè dilatatum.*

Hab. — ?

5. MACROCHISMA MEGATREMA, A. Adams. *M. testâ ovato-oblongâ, albidâ, roseo radiatim pictâ, costellis rugosis striisque concentricis sculptâ, dorso subelevatâ, lateribus planulatis; foramen ovato-lanceolatum, permagnum.*

Hab. — ?

6. MACROCHISMA CUSPIDATA, A. Adams. *M. testâ ovato-oblongâ, anticè angustatâ, productâ, acuminatâ, posticè elevatâ, rotundatâ, margine valdè undulatâ, fuscâ, annulis fuscis concentricis ornatâ, lineis elevatis et concentricis cancellatâ, circa foramen pallidâ, extremitate posticâ valdè elevatâ; foramen magnum, cuspidatum, posticè dilatatum.*

Hab. Cagayan, in insulis Philippinis; H. C. (Mus. Cuming.)

7. MACROCHISMA PRODUCTA, A. Adams. *M. testâ angusto-*

oblongâ, dorso elevatâ, convexâ, albidâ, fusco pallide variegatâ, lineis elevatis striisque concentricis obsolete decussatâ, anticè angustâ, productâ, lateribus alutatis, extremitate posticâ rotundatâ, elevatâ; margine valde sinuatâ; foramen perlongum, triangulare, posticè dilatatum.

Hab. in littoribus Australiæ. (Mus. Cuming.)

8. **MACROCHISMA ANGUSTATA**, A. Adams. *M. testâ angustâ, oblongâ, dorso elevatâ, utrinque rotundatâ, albidâ, lineis fuscis maculisque rufo-fuscis pictâ et tessellatâ, costellis obtusis subrugosis, lineisque depressis, concentricis, subdistantibus, sculptâ, extremitate posticâ elevatâ, margine sinuato; foramen magnum, elongatum, subtriangulare, posticè dilatatum, excavatum.*

Hab. — ?

3. A MONOGRAPH OF MODULUS, A GENUS OF GASTEROPODOUS MOLLUSCA, OF THE FAMILY LITTORINIDÆ. BY ARTHUR ADAMS, R.N., F.L.S.

MODULUS, Gray.

Animal with the head probosciform, the tentacles tapering, with the eyes near their distal ends. Foot small, the sides simple, without lobes or filaments. Operculum thin, horny, orbicular, paucispiral. Shell globose or conical, whorls nodulous; aperture round, or quadrangular, not pearly within; columella anteriorly with a prominent lamelliform tooth; umbilicus more or less open.

Modulus, Gray.—Turbo, sp. *Adanson*—*Monodonta*, sp. *Lamck.*—*Monodonta*, *Swains.*—*Morulus*, *Reeve.*

The aperture of the shell not being pearly within, and the animal being destitute of eye-peduncles, head- and foot-lobes or filaments, at once distinguishes this genus from *Monodonta*, and removes it from the family *Trochidæ*.

1. **MODULUS LENTICULARIS**, Chemnitz.

Trochus lenticularis, *Chem. Conch.* 5. t. 171. f. 1665.

Trochus modulus, *Linn. Gmel.*

Hab. Mexico. (Mus. Cuming.)

2. **MODULUS TECTUM**, Gmel.

Trochus tectum, *Gmel.* p. 3569. no. 16.

Monodonta retusa, *Lamck. Encyclop.*

Hab. Siquejar, Philippines; *H. C.* (Mus. Cuming.)

3. **MODULUS CARCHEDONICUS**, Lamck.

Monodonta carchedonicus, *Lamck. Hist. An.s. Vert.* tom.vii. p. 33; *Chem. Conch.* 10. t. 165. f. 1583, 1584.

Monodonta Sayii, *Nuttall.*

Hab. Atcoi, California; *Nuttall.* (Mus. Cuming.)

4. *MODULUS CIDARIS*, Reeve.

Morulus cidaris, Reeve, *Elements of Conch.* p. 141. pl. 13. f. 63.

Hab. St. Estivan; *H. C.* (Mus. Cuming.)

5. *MODULUS CERODES*, A. Adams. *M. testâ turbinatâ, umbilicatâ, albâ, fusco sparsim inquinatâ, lævigatâ; anfractibus rotundatis, supra planulatis, in medio cingulâ bituberculatâ, infernè cingulis nodulosis ornatis; aperturâ rotundâ; labio purpureo tincto, labro intus lævigato; umbilico profundo, callo columellari subobtecto.*

Hab. ad Fretum Mosambicum. (Mus. Cuming.)

6. *MODULUS DUPLICATUS*, A. Adams. *M. testâ orbiculato-conicâ, umbilicatâ, cærulescenti, fusco variegatâ, spirâ prominulâ, acutâ; anfractibus planulatis, transversim sulcatis, ad peripheriam cingulis duabus tuberculorum compressorum ornatis, tuberculis rufo-fusco maculatis, infimâ fasciâ convexâ, concentricè sulcatâ; aperturâ intus violascenti; labro margine angulato, intus lirate; umbilico mediocri.*

Hab. —? (Mus. Cuming.)

7. *MODULUS OBLIQUUS*, A. Adams. *M. testâ orbiculato-conicâ, perobliquâ, albâ, umbilicatâ, spirâ depressâ; anfractibus subplanulatis, liris transversis, elevatis, supra radiatim nodosoplicatis, ultimo in medio angulato, carinâ prominulâ instructo, infra cingulis transversis elevatis numerosis ornato; aperturâ rotundâ; columellâ roseo tinctâ; labro intus lirate.*

Hab. Mare Rubrum. (Mus. Cuming.)

EGLISIA CUMINGII, A. Adams. *E. testâ turritâ, solidâ, albâ, longitudinaliter fusco-flammulatâ; anfractibus rotundatis, cingulis acutis, transversis (in anfractu ultimo sex), lineisque elevatis, transversis, interpositis, ornatis, interstitiis longitudinaliter tenuissimè striatis, varicibus tenuibus, longitudinalibus, inæquidistantibus, instructis; aperturâ rotundatâ, peristomate continuo, labio incrassato, anticè producto, calloso, et reflexo; labro simplici, acuto.*

Hab. Japonia. (Mus. Cuming.)

The obscure longitudinal varices show the true position of this genus to be between *Turritella* and *Scalaria*.

4. A MONOGRAPH OF CYLLENE, A GENUS OF GASTEROPODOUS MOLLUSCA. BY ARTHUR ADAMS, R.N., F.L.S. ETC.

CYLLENE, Gray.

Animal unknown. Operculum thin, horny, unguiform, with terminal nucleus and imbricate elements. Shell ovate, volutiform; spire short; suture channeled; aperture oval; columella anteriorly with oblique grooves; outer lip thickened externally, notched in front, grooved within, and subreflected at the margin.

1. CYLLENE LYRATA, Lamarck.
Buccinum lyratum, Lamk. *Hist. An. s. Vert.* tom. vii. p. 272; Kiener, *Mon. Bucc.* pl. 22. fig. 88.
2. CYLLENE GRAYI, Reeve.
Cyllene Grayi, Reeve, *Elements of Conch.* pl. 3. fig. 12.
3. CYLLENE OWENII, Gray.
Cyllene Owenii, Gray, *MSS. Brit. Mus.*
4. CYLLENE PULCHELLA, Adams and Reeve.
Cyllene pulchella, Adams and Reeve, *Zool. of Voy. of H.M.S. Samarang*, tab. 10. fig. 11.
5. CYLLENE LUGUBRIS, Adams and Reeve.
Cyllene lugubris, Adams and Reeve, *Zool. Voy. Samarang*, tab. 10. fig. 10.
6. CYLLENE CONCINNA, Soland. *C. testâ ovato-fusiformi; spirâ productâ, albâ, maculis luteo-fuscis ornatâ, longitudinaliter subsulcosâ, transversim totâ striatâ; columellâ anticè obliquè plicatâ; labro extus lævi, incrassato.*
Hab. Guinea.
Buccinum concinnum, Sol.
7. CYLLENE ORIENTALIS, A. Adams. *C. testâ ovato-fusiformi, albidâ, maculis luteo-fuscis ornatâ, longitudinaliter plicatâ, transversim striatâ; spirâ prominulâ; columellâ anticè per-obliquè sulcatâ, labro intus lævi.*
Hab. Singapore, 6 fathoms, mud; H. C. Malacca, 6 fathoms, coarse sand; H. C.
8. CYLLENE STRIATA, A. Adams. *C. testâ ovatâ, albâ, maculis rufo-fuscis ad suturas pictâ, cingulis duabus maculorum luteo-fuscorum ornatâ, longitudinaliter subplicatâ, transversim totâ striatâ; columellâ anticè obliquè sulcatâ; labro tenui, intus lævi, anticè vix sinuato.*
Hab. Albrookkas Islands, under coral, low water; Mr. Dring.
9. CYLLENE FUSCATA, A. Adams. *C. testâ ovatâ, rufo-fusâ, fasciis transversis obscuris articulatis ornatâ, longitudinaliter plicatâ, plicis numerosis, subconfertis, supernè et infernè transversim valdè striatâ; columellâ anticè valdè corrugato-plicatâ, labro anticè valdè sinuato.*
Hab. W. Africa.
10. CYLLENE PALLIDA, A. Adams. *C. testâ ovatâ, albidâ, longitudinaliter subsulcatâ, obscure nodoso-plicatâ, glabrâ, supernè et infernè transversim striatâ; columellâ anticè plicis obliquis, labro anticè valdè sinuato.*
Hab. West Africa.
11. CYLLENE GRANA, Lamarck.
Buccinum grana, Lamk.; Kiener, *Mon.* pl. 16. fig. 58.

12. CYLLENE GLABRATA, A. Adams. *C. testâ ovato-fusiformi, glabrâtâ, cinerâ, fasciis albis tribus transversis rufo-articulatis ornatâ, longitudinaliter subplicatâ, plicis infernè evanidis, supernè et infernè transversim striatâ; aperturâ angustâ; columellâ anticè obliquè plicatâ, labro anticè subsinuato.*

Hab. Pasicao, 9 fathoms, fine sand; *H. C.*

5. ON THE UMBRELLA BIRD (CEPHALOPTERUS ORNATUS),
 "UERAMIMBÉ," L. G. BY ALFRED R. WALLACE. COMMUNICATED BY MR. S. STEVENS.

Having had the opportunity of observing this singular bird in its native country, a few remarks on its characters and habits may not perhaps be uninteresting, at a time when a consignment from me will have arrived in England.

The Umbrella Bird is about the size of a crow, averaging about 18 inches in length. Its colour is entirely black, but varied with metallic blue tints on the outer margin of the feathers. The colour of the iris is greyish white. It is a powerful bird, the bill being very large and strong, the feet short, and the claws acute.

Were it not for its crest and neck plume, it would appear to an ordinary observer nothing more than a short-legged crow.

The crest is perhaps the most fully developed and beautiful of any bird known. It is composed of long slender feathers, rising from a contractile skin on the top of the head. The shafts are white and the plume glossy blue, hair-like, and curved outward at the tip. When the crest is laid back the shafts form a compact white mass, sloping up from the top of the head, and surmounted by the dense hairy plumes. Even in this position it is not an inelegant crest, but it is when it is fully opened that its peculiar character is developed. The shafts then radiate on all sides from the tip of the head, reaching in front beyond and below the top of the beak, which is completely hid from view. The top then forms a perfect, slightly elongated dome, of a beautiful shining blue colour, having a point of divergence rather behind the centre, like that in the human head. The length of this dome from front to back is about 5 inches, the breadth 4 to 4½ inches. The other singular appendage of this bird is the neck plume. This is a long cylindrical plume of feathers depending from the middle of the neck, and either carried close to the breast or puffed out and hanging down in front. The feathers lap over each other, scale-like, and are bordered with fine metallic blue.

On examining the structure of this plume, it is found not to be composed of feathers only, growing from the neck, as seems to have been hitherto supposed. The skin of the neck is very loose; looser and larger, in fact, than in any bird I know of. From the lower part grows a cylindrical fleshy process about as thick as a goose-quill and an inch and a half long. From this grow the feathers to the very point, thus producing the beautiful cylindrical plume quite detached from the breast, and forming an ornament as unique and elegant as the crest itself.

When in motion, either flying or feeding, the crest is laid back and the plume carried close to the breast, so as not to be conspicuous. When at rest in the daytime, the crest is fully expanded, and the plume is rather enlarged and hanging forward. At night, when asleep, all the feathers are puffed out to their fullest extent, and sometimes the head is turned so as to bring the dome of the crest on the middle of the back. It then presents a most singular appearance, the head and feet being quite invisible, the plume and crest alone being conspicuous amidst the mass of feathers.

These observations I was enabled to make by having a fine male alive for ten days. He had received a shot in the head, but appeared to suffer no ill effects from it, till on the tenth day he suddenly fell off his perch and died. I found, on skinning him, that the shot had broken his skull and entered the brain.

The Umbrella Bird inhabits the islands of the rivers, never having been seen on the main land. It is perfectly arboreal, never descending to the ground. Its food is fruit of various kinds, but when this is scarce it eats insects: my hunter saw one with a large hairy spider (*Mygale*) in his mouth. On seizing an insect or fruit, it strikes its beak against its perch several times, apparently to kill or soften it, or secure it more firmly in its beak, and then after two or three bites swallows it entire. Some of the fruits it eats are about the size of a damson, and have a stone, which it ejects through its mouth an hour or two after eating.

Its note is very loud and deep, and it is from this that it has received its Indian name "Ueramimbé," signifying the "Piper-bird." It utters its note early in the morning and in the afternoon. It frequents the very loftiest forest trees, but is said to build its nest rather lower. Its nest is said to be formed of sticks very roughly, and the young are very naked and ugly. The colour or size of the eggs I have not been able to ascertain.

In ascending the Amazon, it first occurs opposite the mouth of the Madeira, in some islands. In the Sohuives, as far as the boundaries of Brazil, it also occurs, and probably further. The Rio Negro, however, is its head-quarters; and there, in the numerous islands which fill that river, it is very abundant. It extends at least four hundred miles up the river, and very probably much further. I have not heard of its occurring in the Rio Branco, Madeira, or any of the other great tributaries of the Amazon. I have been informed by a hunter, that towards the sources of the Rio Negro another species is found, and this I hope soon to have the means of verifying.

Barra do Rio Negro, March 10th, 1850.

The meeting was then adjourned to Tuesday, November 12.

November 12, 1850. -

W. Yarrell, Esq., V.P., in the Chair.

Professor Owen read a paper "on the Cranium of the large species of *Dinornis* called *giganteus* and *ingens**." He commenced by referring to a former memoir, in which four generic types of structure had been determined in fossil crania of birds from New Zealand, viz. *Nestor*, *Notornis*, *Palapteryx*, and *Dinornis* proper; and proceeded to describe an additional series of fossil skulls obtained by Governor Sir George Grey from a cave in the district which lies between the river Waikato and Mount Tongariro, in the North Island. The most remarkable of these specimens was an almost entire skull, measuring eight inches in length and five inches across the broadest part of the cranium; which in the extent of the ossified part of the mandible and its downward curvature, resembled the smaller skull described in a former memoir, and there referred to *Dinornis*. In the structure of the occiput and base of the cranium, this large skull more resembled the characters of that ascribed to *Palapteryx*. The indications of the muscular attachments, and the form and size of the massive beak, bespoke the great power and force with which it had been habitually applied in the living bird.

Its anatomical characters were minutely detailed. Comparisons of the area of the occipital foramen for the transmission of the spinal marrow with that of the spinal canal in different vertebræ, were made with a view of determining the species to which the cranium in question might belong; and the peculiar contraction of the spinal canal in the vertebræ of *Dinornis* as compared with that in the Ostrich was pointed out. The inference deduced was, that the cranium, notwithstanding its great size, belonged probably to the species called *Palapteryx ingens*, which was the second in point of size.

A mutilated cranium of a much younger bird, showing all the sutures, but of nearly equal size with the skull first described, might belong to the *Dinornis giganteus*. Two crania, referable to two distinct species of smaller birds of *Palapteryx*, were described, and sections of the cranium were shown, to demonstrate the form and character of the brain. In the collection transmitted by Governor Grey, Professor Owen had, for the first time, recognized a portion of a diminutive wing-bone, similar, in the absence of the usual processes for the muscles of flight, to that in the *Apteryx*, and confirmatory, both by this character and its extreme rarity, contrasted with the abundance of vertebræ and leg-bones that had been transmitted, of the inference as to the rudimental condition of the wings in the *Dinornis* and *Palapteryx*.

The memoir concluded with a description of a cranium of the *Notornis*, more perfect than that fragmentary one on which the affinities

* This paper will appear in the Transactions as *Dinornis*, Part V., in continuation of Prof. Owen's previous memoirs.

of that bird to the *Rallidæ* or Coot-tribe had originally been founded, and its generic distinction from *Porphyrio* established. The specimen exhibited confirmed the accuracy of the conjectural restorations in the figure of the original specimen in a former volume of the Transactions of the Society.

The following papers were also read :—

1. NOTICE OF THE DISCOVERY BY MR. WALTER MANTELL IN THE MIDDLE ISLAND OF NEW ZEALAND, OF A LIVING SPECIMEN OF THE NOTORNIS, A BIRD OF THE RAIL FAMILY, ALLIED TO BRACHYPTERYX, AND HITHERTO UNKNOWN TO NATURALISTS EXCEPT IN A FOSSIL STATE. BY GIDEON ALGERNON MANTELL, ESQ., LL.D., F.R.S. ETC.

Amongst the fossil bones of birds collected by my eldest son in the North Island of New Zealand, which I had the honour of placing before the Zoological Society in 1848, in illustration of Professor Owen's description of the crania and mandibles of *Dinornis*, *Palapteryx*, &c., there were the skull, beaks, humerus, sternum, and other parts of the skeleton of a large bird of the Rail family, which from their peculiar characters were referred by that eminent anatomist to a distinct genus of *Rallidæ* allied to the *Brachypteryx*, under the name of *Notornis* *; a prevision, the correctness of which is confirmed by the recent specimen that forms the subject of the present communication.

Towards the close of last year I received from Mr. Walter Mantell another extensive and highly interesting collection of fossils, minerals, and rock specimens, obtained during his journey along the eastern coast of the Middle Island, from Banks' Peninsula to the south of Otago, in the capacity of Government Commissioner for the settlement of native claims. This series comprised also a fine suite of birds' bones from Waingongoro, the locality whence the former collection was chiefly obtained, and among them were relics of the *Notornis*, and crania and mandibles of *Palapteryx*.

The results of my son's observations on the geological phenomena presented by the eastern coast of the Middle Island are embodied in a paper read before the Geological Society in February last, and published in vol. v. of the 'Quarterly Journal.' It will suffice for my present purpose to mention that they confirm in every essential particular the account given of the position and age of the ornithic ossiferous deposits, in my first memoir on this subject †.

The only fact that relates to the present notice is the nature of the bone-bed at Waikonaiti, whence Mr. Percy Earl, Dr. Mackellar, and other naturalists procured the first relics of the gigantic birds, sent by those gentlemen to England, which are figured and described in the 'Zoological Transactions.'

This so-called tertiary deposit is situated in a little bay south of Island Point, near the embouchure of the river Waikonaiti, and is

* Zoological Transactions, vol. iii. p. 366. † Geological Journal, vol. iv.

only visible at low-water, when bones more or less perfect are occasionally observable projecting from the waterworn surface of the bog. This deposit is about 3 feet in depth and not more than 100 yards in length; the extent inland is concealed by vegetation and a covering of superficial detritus, and is supposed to be very inconsiderable. This bed rests upon a blue tertiary clay that emerges here and there along that part of the coast, and which abounds in shells and corals, of species existing in the adjacent sea.

This bone deposit was evidently a morass or swamp, on which the New Zealand flax (*Phormium tenax*) once grew luxuriantly. Bones of the larger species of Moa have from time to time been obtained from this spot by the natives and European visitors; and, as in the menaccanite sand beds at Waingongoro, they are associated with bones of one species of dog and two species of seal: my son also collected crania and other remains of a species of *Apteryx* (probably *Ap. Australis*), Albatros, Penguin, and of some smaller birds whose characters and relations have not yet been ascertained: no bones of the *Notornis* were observed in this locality.

It was from this ancient morass that my son obtained the entire series of bones composing the pair of feet of the same individual *Di-nornis robustus*, standing erect, the one about a yard in advance of the other, as if the unfortunate bird had sunk in the slough, and unable to extricate itself had perished on the spot. The upper or proximal ends of the tarso-metatarsals were alone visible above the sod on the retiring of the tide; these were carefully dug round, and the phalanges exposed in their natural order and connection: the bones were numbered as they were extracted from the soil, and thus the normal elements of the locomotive organs of one of the colossal struthious bipeds of New Zealand were for the first time determined*.

It was in the course of last year, on the occasion of my son's second visit to the south of the Middle Island, that he had the good fortune to secure the recent *Notornis* which I have now the pleasure of submitting to this Society, having previously placed it in the hands of the eminent ornithologist Mr. Gould to figure and describe, as a tribute of respect for his indefatigable labours in this department of Natural History.

This bird was taken by some sealers who were pursuing their avocations in Dusky Bay. Perceiving the trail of a large and unknown bird on the snow with which the ground was then covered, they followed the foot-prints till they obtained a sight of the *Notornis*, which their dogs instantly pursued, and after a long chase caught alive in the gully of a sound behind Resolution Island. It ran with great speed, and upon being captured uttered loud screams, and fought and struggled violently; it was kept alive three or four days on board the schooner and then killed, and the body roasted and ate by the crew, each partaking of the dainty, which was declared to be delicious. The beak and legs were of a bright red colour. My son

* The principal dimensions of these bones are given in the Quarterly Journal of the Geological Society, vol. vi. p. 338; and figures with descriptions in 'The Pictorial Atlas of Organic Remains,' just published.

secured the skin, together with very fine specimens of the Kakapo or Ground Parrot (*Strigops*), a pair of Huïas (*Neomorpha*), and two species of Kiwi-kiwi, namely *Apteryx Australis* and *Ap. Oweni*; the latter very rare bird is now added to the collection of the British Museum.

Mr. Walter Mantell states, that, according to the native traditions, a large Rail was contemporary with the Moa, and formed a principal article of food among their ancestors. It was known to the North Islanders by the name of "*Moho*," and to the South Islanders by that of "*Takahé*;" but the bird was considered by both natives and Europeans to have been long since exterminated by the wild cats and dogs, not an individual having been seen or heard of since the arrival of the English colonists. That intelligent observer, the Rev. Richard Taylor, who has so long resided in the islands, had never heard of a bird of this kind having been seen. In his '*Leaf from the Natural History of New Zealand**,' under the head of "*Moho*," is the following note: "*RAIL*, colour black, said to be a wingless bird as large as a fowl, having a long bill and red beaks and legs; it is nearly exterminated by the cat: its cry was '*keo, keo*.'" The inaccuracy and vagueness of this description prove it to be from native report and not from actual observation. To the natives of the pahs or villages on the homeward route, and at Wellington, the bird was a perfect novelty and excited much interest. I may add, that upon comparing the head of the bird with the fossil cranium and mandibles, and the figures and descriptions in the '*Zoological Transactions*' (pl. 56), my son was at once convinced of their identity; and so delighted was he by the discovery of a living example of one of the supposed extinct contemporaries of the Moa, that he immediately wrote to me, and mentioned that the skull and beaks were alike in the recent and fossil specimens, and that the abbreviated and feeble development of the wings, both in their bones and plumage, were in perfect accordance with the indications afforded by the fossil humerus and sternum found by him at Waingongoro, and now in the British Museum, as pointed out by Professor Owen in the memoir above referred to.

It may not be irrelevant to add, that in the course of Mr. Walter Mantell's journey from Banks' Peninsula along the coast to Otago, he learnt from the natives that they believed there still existed in that country the only indigenous terrestrial quadruped, except a species of rat, which there are any reasonable grounds for concluding New Zealand ever possessed. While encamping at Arowenua in the district of Timaru, the Maoris assured him that about ten miles inland there was a quadruped which they called Kaurēke, and that it was formerly abundant, and often kept by their ancestors in a domestic state as a pet animal. It was described as about two feet in length, with coarse grisly hair; and must have more nearly resembled the Otter or Badger than the Beaver or the *Ornithorhynchus*, which the first accounts seemed to suggest as the probable type. The offer of a liberal reward induced some of the Maoris to start for the interior of the country where the Kaurēke was supposed to be located, but

* Published at Wellington, 1848.

they returned without having obtained the slightest trace of the existence of such an animal; my son, however, expresses his belief in the native accounts, and that if the creature no longer exists, its extermination is of very recent date.

In concluding this brief narrative of the discovery of a living example of a genus of birds once contemporary with the colossal Moa, and hitherto only known by its fossil remains, I beg to remark, that this highly interesting fact tends to confirm the conclusions expressed in my communications to the Geological Society, namely, that the *Dinornis*, *Palapteryx*, and related forms, were coeval with some of the existing species of birds peculiar to New Zealand, and that their final extinction took place at no very distant period, and long after the advent of the aboriginal Maoris. As my son at the date of his last letter was about to depart on another exploration of the bone deposits of the North Island, I indulge the hope that he will ere long have the gratification of transmitting or bringing to England additional materials for the elucidation of the extinct and recent faunas of New Zealand.

With much pleasure I resign to Mr. Gould the description of the ornithological characters and relations of this, in every sense, *rara avis*, from the Isles of the Antipodes.

Chester Square, Pimlico, November 1, 1850.

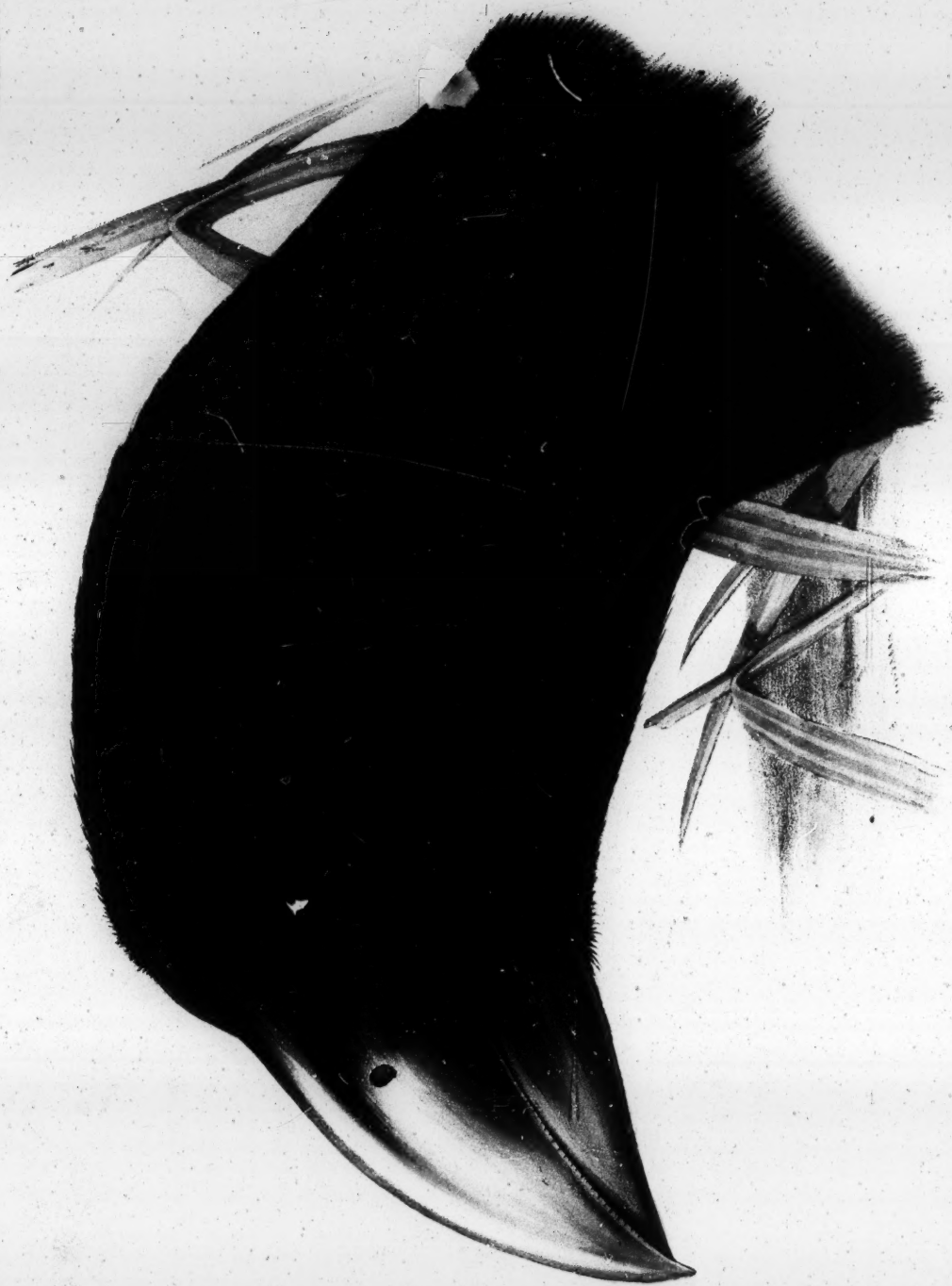
2. REMARKS ON NOTORNIS MANTELLI. BY J. GOULD, F.R.S.

(Aves, Pl. XXI.)

Dr. Mantell having kindly placed his son's valuable acquisition in my hands for the purpose of characterizing it in the Proceedings of the Society, and of afterwards figuring and describing it in the appendix to my work on the 'Birds of Australia,' I beg leave to commence the pleasing task he has assigned to me.

The amount of interest which attaches to the present remarkable bird is perhaps greater than that which pertains to any other with which I am acquainted, inasmuch as it is one of the few remaining species of those singular forms which inhabited that supposed remnant of a former continent—New Zealand, and which have been so ably and so learnedly described, from their semi-fossilized remains, by Professor Owen; who, as well as the scientific world in general, cannot fail to be highly gratified by the discovery of a recent example of a form previously known to us solely from a few osteological fragments, and which, but for this fortunate discovery, would in all probability, like the Dodo, have shortly become all but traditional. While we congratulate ourselves upon the preservation of the skin, we must all deeply regret the loss of the bones, any one of which would have been in the highest degree valuable for the sake of comparison with the numerous remains which have been sent home from New Zealand.

Upon a cursory view of this bird it might be mistaken for a gigantic kind of *Porphyrio*, but on an examination of its structure it will be



found to be generically distinct. It is allied to *Porphyrio* in the form of its bill and in its general colouring, and to *Tribonyx* in the structure of its feet, while in the feebleness of its wings and the structure of its tail it differs from both.

From personal observation of the habits of *Tribonyx* and *Porphyrio*, I may venture to affirm that the habits and œconomy of the present bird more closely resemble those of the former than those of the latter; that it is doubtless of a recluse and extremely shy disposition; that being deprived, by the feeble structure of its wing, of the power of flight, it is compelled to depend upon its swiftness of foot for the means of evading its natural enemies; and that, as is the case with *Tribonyx*, a person may be in its vicinity for weeks without ever catching a glimpse of it.

From the thickness of its plumage and the great length of its back-feathers, we may infer that it affects low and humid situations, marshes, the banks of rivers, and the coverts of dripping ferns, so abundant in its native country: like *Porphyrio*, it doubtless enjoys the power of swimming, but would seem, from the structure of its legs, to be more terrestrial in its habits than the members of that genus.

I have carefully compared the bill of this example with that figured by Professor Owen under the name of *Notornis Mantelli*, and have little doubt that they are referable to one and the same species; and as we are now in possession of materials whence to obtain complete generic characters, I hasten to give the following details, in addition to those supplied by Professor Owen.

Bill somewhat shorter than the head; greatly compressed on the sides, both mandibles being much deeper than broad; tomia sharp, curving downwards, inclining inwards and slightly serrated; culmen elevated, much arched and rising on the forehead to a line with the posterior angle of the eye; *nostrils* round, and placed in a depression near the base of the bill; wings very short, rounded, and slightly concave; primaries soft and yielding; the first short; third, fourth, fifth, sixth and seventh equal and the longest; tail-feathers soft, yielding, and loose in texture; tarsi powerful, longer than the toes, almost cylindrical; very broad anteriorly; defended in front and on either side posteriorly by broad and distinct scutellæ; the spaces between the scutellæ reticulated; anterior toes large and strong, armed with powerful hooked nails, and strongly scutellated on their upper surface; hind-toe short, strong, placed somewhat high on the tarsus, and armed with a blunt hooked nail.

Head, neck, breast, upper part of the abdomen and flanks purplish blue; back, rump, upper tail-coverts, lesser wing-coverts and tertiaries dark olive-green, tipped with verditer-green; at the nape of the neck a band of rich blue separating the purplish blue of the neck from the green of the body; wings rich deep blue, the greater coverts tipped with verditer-green, forming crescentic bands when the wing is expanded; tail dark green; lower part of the abdomen, vent and thighs dull bluish black; under tail-coverts white; bill and feet red.

Total length of the body, 26 inches; bill, from the gape to the

tip, $2\frac{1}{8}$; from the tip to the posterior edge of the plate on the forehead, 3; wing, $8\frac{1}{2}$; tail, $3\frac{1}{2}$; tarsi, $3\frac{1}{2}$; middle toe, 3; nail, $\frac{7}{8}$; hind-toe, $\frac{7}{8}$; nail, $\frac{3}{4}$.

I cannot conclude these remarks without bearing testimony to the very great importance of the results which have attended the researches of Mr. Walter Mantell in the various departments of science to which he has turned the attention of his cultivated, intelligent and inquiring mind, nor without expressing a hope that he may yet be enabled to obtain some particulars as to the history of this and the other remarkable birds of the country in which he is resident.

November 26, 1850.

R. H. Solly, Esq., F.R.S., in the Chair.

The following papers were read:—

1. LIST OF BIRDS PROCURED IN KORDOFAN BY MR. J. PETHERICK. WITH NOTES BY H. E. STRICKLAND, M.A., F.G.S.

(Aves, Pl. XXII. XXIII. XXIV.)

[Species not enumerated in Rüppell's 'Systematische Uebersicht der Vögel Nord-Ost-Afrika's,' 8vo, Frankfurt a. M. 1845, are marked N.

Species common to the West Coast of Africa are marked W. These are chiefly determined by reference to Dr. Hartlaub's valuable list of West African birds in the 'Verzeichniss der öffentlichen u. Privat-Vorlesungen am Hamburgischen Gymnasium,' 4to, Hamburg, 1850.]

1. *Neophron percnopterus*.

2. *Vultur occipitalis*.

3. *Otogyps auricularis*.

4. BUTEO RUFIPENNIS, Strickland, n. s. Upper parts cinereo-fuscous, nearly black on the crown; feathers of back and wing-covers with black shafts; cheeks cinereous, a black line below them from angle of mouth; chin whitish, with a medial dark streak; breast and sides ferruginous brown, with a conspicuous medial black streak one-sixteenth of an inch wide on each feather; belly, thighs and vent plain fulvous; primaries and secondaries bright ferruginous, tipped for about an inch and a half with black, and from three to five distant transverse black bands on the inner web; tail cinereo-fuscous, with five dark fuscous bands, each about a quarter of an inch wide, the distal one about half an inch, beyond which the extremity is cinereo-fuscous and the extreme tip white; cere and legs yellowish; beak and claws black.

Length 17 inches; wing, $12\frac{1}{4}$; medial rectrices, $7\frac{1}{2}$; external ditto, $7\frac{1}{8}$; tarsus, $2\frac{1}{4}$.

Hab. Kordofan. (Aves, Pl. XXII.)



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BUTEO RUFIPENNIS. Strickl



MELAFRA CORDOFANICA. Strickl.

5. *Aquila naevia*.
6. *Aquila pennata*.
7. *W. Circaetus brachydactylus*.
8. *Helotarsus ecaudatus*.
9. *Falco biarmicus*, Temm. (*F. peregrinoides*, Temm.; *F. chiqueroides*, Smith; *F. feldeggii*, Schlegel; *F. lanarius*, Schlegel; *F. rubeus*, Thienemann; *F. cervicalis*, Kaup.)

After a careful examination of many specimens, I feel justified in uniting the above synonyms under one species. This is essentially an African bird, extending from the Cape of Good Hope to Egypt, whence it has probably spread into Greece and Dalmatia, to which portions of Europe it is chiefly confined, though a single straggler has occurred in Germany. It is at once distinguished from *F. peregrinus* by the shorter toes, and the fulvous patch on the crown. The *Falco jugger*, Gray (*F. luggur*, Jerdon), of India is closely allied, but seems to differ constantly in the plumes of the tibia being uniformly dark brown, while in *F. biarmicus* they are cream-coloured or white, like the rest of the under parts, with a small brown spot on the centre of each feather. This is one of the many species to which the name *Falco lanarius* has been given, under the supposition that it may be the *Lanner* of the old works on falconry; but as the original *F. lanarius* of Linnaeus is now admitted to be the young of *F. gyrfalco*, and as systematists are generally agreed not to trace binomial titles further back than Linnaeus's *Systema*, of course the specific name *lanarius* must be dropped altogether, and the oldest binomial name, *Falco biarmicus*, Temm., adopted for the present species.

10. *W. Tinnunculus alaudarius* (Gm.). This widely diffused species extends, without variation of form or colour, from Britain southwards to Central Africa and eastwards to India.

11. *N. W. Nauclerus riocouri*, Vieill.

12. *Accipiter sphenurus*, juv.? Resembles *A. sphenurus*, Rüpp., in the cuneate form of the tail. Head and neck rufescent, with a fuscous medial stripe on each feather; belly white, barred with brown; back cinereous brown with rufous margins; *upper tail-covers white*; tail cinereous, with three broad fuscous bars, outer feather white, with five bars.

13. *N. Accipiter carbonarius* (Licht.). Two specimens agree with Lichtenstein's description (in his *Verzeichniss einer Sammlung von Säugethieren u. Vögeln aus dem Kafferlande*, 8vo, Berlin, 1842, p. 11), except in having only *three or four* white bands on the tail instead of *five*. With the exception of these bands, and the numerous light and dark brown bands on the remiges, the plumage is wholly black; cere and legs yellow.

Total length, 12 inches; wing, 7; tarsus, $1\frac{6}{10}$.

14. *W. Melierax gabar* (Daud.). (*Accipiter erythrorhynchus*, Sw.)

15. *Melierax polyzonus*, Rüpp. United by Mr. Gray to *M. canorus*, Rislach (*M. musicus*, Daud.), but differs in its smaller size, and in having the upper tail-covers banded grey and white, while in *M. ca-*

norus they are pure white. The wing in *M. polyzonus* measures 12 inches, in *M. canorus*, 15 inches.

16. W. *Polyboroides radiatus* (Scop.). (*Falco gymnogenys*, Temm.)

17. N. *Circus pallidus*, Sykes.

18. W. *Scops leucotis* (Temm.).

19. W. *Scotornis climacurus* (Vieill.).

20. *Caprimulgus infuscatus*, Cretzschm., female. Agrees with Rüppell's plate, but wants the white wing- and tail-spots of the male bird.

21. W. *Eurystomus afer* (Lath.). (*E. orientalis*, Rüpp.; *E. rubescens*, Vieill.; *Collaris purpurascens*, Wagl.)

22. W. *Coracias abyssinica*, Gm. (*Coracias caudata*, Wagl.)

23. W. *Coracias naevia*, Daud. (*C. levaillanti*, Rüpp.; *C. nuchalis*, Swains.)

24. W. *Ceryle rudis* (Linn.). (*Ispida bicincta*, Swains.; *I. bitorquata*, Swains.) Identical with specimens from Smyrna and S. Europe. The individuals with two pectoral bands (*I. bicincta*, Swains.) are the males.

25. N. W. *Merops albicollis*, Vieill. (*M. cuvieri*, Licht.; *M. savignyi*, Swains.)

26. W. *Merops nubicus*, Gm. (*M. superbus*, Shaw; *M. caeruleocephalus*, Lath.)

27. W. *Merops lamarki*, Cuv. (*M. viridissimus*, Sw.; *M. aegyptius*, Kittlitz; *M. viridis*, Rüpp.) Closely allied to *M. viridis*, Linn., of India, but smaller, with a larger mixture of golden yellow in the plumage, the throat not blue as in *M. viridis*, and the remiges are rufous on both webs, with scarcely any tinge of green externally.

28. W. *Merops erythropterus*, Gm. (*M. minutus*, Cuv.; *M. colaris*, Vieill.; *M. lafresnayei*, Guérin.)

29. *Irisor senegalensis* (Vieill.)? The Kordofan specimens agree, in the shortness and nearly straight form of their beak, with the black-beaked species of W. Africa, *I. senegalensis*, Vieill. (*Nectarinia melanorhynchus*, Licht.), but in the red colour of this organ they agree with the Cape species (*I. erythrorhynchus*). It is well known that the females of the latter have the beak much shorter and straighter than the males; yet in these Kordofan specimens the beak, though of the same length, is considerably straighter than in the female birds from the Cape. Like *I. senegalensis* they have a broad white bar crossing the inner webs of the first three, and both webs, shaft included, of the remaining primaries; while in *I. erythrorhynchus* the white bar of the primaries is much narrower, and divided by the black shaft.

30. *Nectarinia metallica*, Ehrenb.

31. W. *Nectarinia pulchella* (Linn.).

32. *Phylloscopus trochilus* (Linn.). Identical with British specimens.

33. *Saxicola deserti*, Temm.

34. *Saxicola cinanthe* (Linn.).

35. *Saxicola isabellina*, Cretzschm. This is probably the *Sylvia*

leucorrhoea, Gm., in which case it extends to Senegal. It resembles *S. ænanthe*, but is paler on the upper part, and has less white on the lateral rectrices, the terminal black portion being $1\frac{1}{10}$ inch in length, while in *S. ænanthe* it is only about $\frac{3}{4}$ inch.

36. *Motacilla capensis*, Linn.

37. *Budytes melanocephala* (Licht.).

38. *Anthus* (undetermined species).

39. W. *Melæornis? erythropterus* (Gm.). (*Turdus erythropterus*, Gm.) This bird approaches nearly to the type of *Melæornis*, Gray (*Melasoma*, Sw.), though the beak is rather more elongated, and the rictal bristles less developed, than in *M. edolioides*, Sw. Rüppell refers it to Boie's genus *Cercotrichas*, which is synonymous with *Copsychus*, Wagl. Dr. Hartlaub places it in *Argya*, Lesson, which is synonymous with *Chætops*, Sw.

40. W. *Pycnonotus barbatus* (Desfontaines). (*Turdus barbatus*, Desfont. in Mém. Ac. Sc. 1787; *Turdus arsinoe*, Licht.; *Ixos obscurus*, Temm.; *I. inornatus*, Fraser; *Hæmatornis lugubris*, Less.)

41. *Oriolus galbula*, Linn.

42. W. *Dicrurus divaricatus*, Licht. (*D. lugubris*, Ehrenb.; *D. canipennis*, Swains.) Nearly allied to the *D. musicus*, Vieill., of S. Africa, but has the tail less deeply forked, the culmen of the beak more acute, and the primaries pale internally.

43. *Lanius algeriensis*, Less. in Rev. Zool. 1839. This is probably the species termed *L. excubitor* by Rüppell. It differs from the true *excubitor* of N. Europe in the greater extent of white on the primaries, and in the two external pairs of rectrices being wholly white (except the shafts). It closely approaches *L. lahtora* of India, and only differs in wanting the narrow band of black across the front.

44. *Lanius nubicus*, Licht. (*L. personatus*, Temm.)

45. *Lanius collurio*, Linn. A young male specimen appears referable to this species.

46. N. *Lanius isabellinus*, Ehrenberg, Symb. Phys. fol. e. This species is pale fulvo-cinereous above, cream-coloured below; rump and tail rufous; a broad blackish band from the nostril to the ear-covers, margined above by a whitish streak. It much resembles *L. arenarius*, Blyth, Journ. As. Soc. Beng. vol. xv. p. 304, but is of a more cinereous tinge above, and is distinguished from that and all the allied Asiatic species by possessing a conspicuous white band at the base of the fourth to the ninth primaries. The specimen from Kordofan has an obscure dark transverse band near the tips of the rectrices.

47. W. *Telophonus senegalus* (Linn.). (*Lanius erythropterus*, Shaw.)

48. W. *Corvus scapulatus*, Daud. (*C. leuconotus*, Sw.)

49. *Corvus umbrinus*, Sundevall. Distinguished by the length and curvature of the beak, and by the grey-brown tint of the head and neck.

50. W. *Juida rufiventris*, Rüpp.

51. W. *Juida chalybea*, Ehrenb. (*Lamprotornis cyanotis*, Sw.)

52. W. *Ploceus luteolus*, Licht. (*P. personatus*, Vieill., Jard. Contrib. to Ornith. 1849, p. 35. pl. 7.)

53. *W. Ploceus sanguinirostris* (Linn.).
54. *W. Pyromelana ignicolor* (Vieill.).
55. *W. Vidua paradisea* (Linn.). The series of immature specimens in the collection have enabled me to detect a curious structure connected with the development of the tail-feathers, which will be treated of in a separate paper. See Sir W. Jardine's 'Contributions to Ornithology,' 1850, p. 88. pl. 59.
56. *W. Vidua principalis* (Linn.). The specimen from Kordofan, like those from Senegal, has a black spot on the chin, but it is not yet proved whether the presence of this spot amounts to a specific distinction.
57. *W. Pytelia elegans* (Gm.).
58. *W. Amadina fasciata* (Gm.). (*Fringilla detruncata*, Licht.)
59. *W. Amadina cantans* (Gm.). A perfectly typical *Amadina*, though M. Rüppell makes it an *Estrilda*.
60. *W. Philetærus nitens* (Gm.). (*Amadina nitens*, Sw.) From the peculiar form of the beak I am disposed to refer this species, as well as *Estrilda squamifrons*, Smith, *E. musica*, Gray, and *Loxia frontalis*, Daud., to the genus *Philetærus*.
61. *Crithagra lutea* (Licht.), Temm. Pl. Col. 365.
62. *W. Passer simplex*, Licht. (*Pyrgita swainsoni*, Rüpp.)
63. *Emberiza striolata*, Rüpp.
64. *Galerida cristata* (Linn.)? This is probably the bird so designated by Rüppell, who states it to be abundant in the whole of N. Africa. It precisely agrees with European specimens in form, but is of a much paler colour, which however may be easily explained by the bleaching effect of the sun's rays in the scorching deserts which this bird frequents.
65. **N. MIRAFRA CORDOFANICA**, Strickland, n. s. Above ferruginous, the feathers of the crown and back with an indistinct medial dusky streak, and margined on their inner side with rusty white; tertials broadly margined with whitish, that colour being separated from the ferruginous of the medial portion by a narrow dusky line; secondaries ferruginous, margined externally with whitish; primaries ferruginous at the base, their distal half being pale rufo-fuscous; medial pair of rectrices ferruginous, the next pair pale rufo-fuscous, the two following pairs deep fuscous, with a very narrow rufescent margin, the penultimate pair deep fuscous internally; the external web, and part of the inner at the tip, white; external pair white, the inner web fuscous towards the base; cheeks pale rufo-fuscous, chin and throat white, breast and lower parts pale cream-colour, the former with a few pale rufo-fuscous subtriangular spots; lower wing-covers and sides rufescent; beak, feet and claws pale yellowish. (Aves, Pl. XXIII.)
- Total length, $5\frac{1}{4}$ inches; beak to front, $\frac{1}{2}$, to gape, $\frac{6}{10}$; wing, $3\frac{2}{10}$; medial and external rectrices, $2\frac{7}{10}$; tarsus, $\frac{9}{10}$; middle toe and claw, $\frac{7}{10}$; hind toe, $\frac{3}{10}$; hind claw, $\frac{2}{10}$.
- This, which seems to be a typical *Mirafra*, is remarkable for the predominance of a pure ferruginous tint on its upper parts. The hind

claw is remarkably short, though not more so than in some of the Indian species of *Mirafra*. The single specimen that occurred of this bird is now in the British Museum.

66. *ALAUDA ERYTHROPYGIA*, Strickland, n. s. Upper parts deep fuscous brown, the feathers narrowly margined with rufo-fulvous; upper tail-covers ferruginous; remiges deep fuscous, almost black on both webs, secondaries narrowly tipped with pale fulvous; tail fuscous black, the middle rectrices narrowly margined with ferruginous, the bases of all ferruginous, extending obliquely nearly to the tips of the outer pair. Lower parts pale fulvous, the chin, throat and breast with a broad medial fuscous streak on each feather; lower wing-covers black, margins of wing fulvous; beak fuscous; legs flesh-colour; hind claw short and slightly curved. (Aves, Pl. XXIV.)

Length $7\frac{1}{2}$ inches; beak to front, $\frac{6}{10}$, to gape, $\frac{11}{10}$; wing, $4\frac{1}{4}$; medial and external rectrices, 3; tarsus, 1; hind claw, $\frac{3}{10}$.

Hab. Kordofan.

67. W. *Colius macrurus*, Linn. (*C. senegalensis*, Gm.)

68. W. *Tockus erythrorhynchus* (Kuhl).

69. W. *Palæornis torquatus*, Vig. (*P. cubicularis*, Wagl.) This species, which extends across Africa from Abyssinia to Senegal, is identical with specimens from India.

70. W. *Pogonius vieilloti*, Leach. (*P. senegalensis*, Licht.; *P. rubescens*, Temm.) N.B. This generic name was originally written *Pogonia* by Leach (Zool. Misc. vol. ii. p. 45), in which form it had been preoccupied by a genus of plants. Illiger's name, *Pogonias*, had also been preoccupied by a fish-genus; but Leach afterwards corrected it to *Pogonius*, which form had never been used before, and I therefore retain it instead of Mr. G. R. Gray's name *Læmodon* (erroneously written *Laimodon*).

71. *Trachyphonus margaritatus*, Rüpp. (*Tamatia erythropygæ*, Ehrenb.)

72. *Yunx torquilla*, Linn. Identical with specimens from Britain and from India.

73. N. *Oxylophus serratus* (Sparrm.). This Cape bird has never before, I believe, been obtained to the north of the equator. The nearly allied *O. jacobinus* (Bodd.) of India (*Cuculus melanoleucus*, Gm.; *C. passerinus*, Vahl) has the lower parts constantly white. Ehrenberg, in his 'Symbolæ Physicæ,' fol. r, describes a Nubian species under the name of *Cuculus pica*, which from the description seems to be identical with the white-bellied *O. jacobinus* of India. Rüppell erroneously refers this *C. pica* of Ehrenberg to the *Oxylophus afer*, Leach (Levaill. Ois. Afr. pl. 209), of S. Africa, which differs in having dark streaks on the throat, and which appears from Rüppell's observations to be also an Abyssinian bird.

74. W. *Oxylophus glandarius* (Linn.).

75. W. *Columba guinea*, Linn. (*C. trigonigera*, Wagl.)

76. *Numida ptilorhyncha*, Licht.

77. *Francolinus clappertoni*, Vig. Mr. G. R. Gray has separated the *F. clappertoni* of Rüppell as a distinct species, under the name of

F. rüppelli; but the specimens from Kordofan seem to agree equally well with Rüppell's plate of *F. rüppelli* and with Gray's plate of what he regards as the true *clappertoni*, between which I can see no difference.

78. *Coturnix dactylisonans*.

79. N. W. *Pterocles quadricinctus*, Temm. (*P. tricinatus*, Sw.) This African species has long been confounded with the closely allied *P. fasciatus* (Scop.), (*Perdix indica*, Lath.), of India, figured by Mr. Jerdon in his 'Illustrations of Indian Ornithology,' pl. 10 and 36. Specimens sent by Mr. Jerdon have now enabled me to prove their distinction. The general arrangement of colour is almost identical in these two species, the chief distinction being in the feathers of the back, scapulars, tertials and greater wing-covers, which in *P. fasciatus* are marked transversely with bars of a dull iron-grey (or "inky hue," as Mr. Jerdon well describes it), while in *P. tricinatus* these bands are of a deep glossy black. In *P. fasciatus* the wing-covers next the body have two or three of these dark bands alternating with white ones of equal breadth, the subterminal one being dark, and the tip of the feather ochreous yellow. In *P. quadricinctus* the wing-covers have only one black band, (or a very faint trace of a second,) narrowly margined on both sides with a fine white line, the terminal and basal parts of the feather being ochreous. Temminck's original description of *P. quadricinctus* is evidently taken from the African bird, but he erroneously gives India as its habitat, in consequence of having confounded it with *P. fasciata*. Vieillot has increased the confusion by figuring the *quadricinctus* in his 'Galerie des Oiseaux,' pl. 220, under the specific name of *bicinatus*, while his description refers to the true *P. bicinctus*, Temm., a S. African bird.

80. W. *Otis rhaad*, Gm.

81. N. W. *Eupodotis denhami* (Vig.).

82. W. *Ortyxelos meiffreni*, Vieill.

83. W. *Ædicnemus crepitans*, Linn. This seems to me to be undistinguishable from *Æ. senegalensis* (Swains. Birds W. Afr. vol. ii. p. 228), the description of which agrees with the European bird.

84. *Ædicnemus affinis*, Rüpp. So exactly does this agree in size and form with *Æ. crepitans*, that I should have suspected it to be an immature bird, did not M. Rüppell appear so convinced of its distinctness.

85. *Pluvianus ægyptius* (Linn.).

86. *Glareola limbata*, Rüpp. Closely resembles *G. orientalis* of India, but has the external rectrices about an inch longer.

87. N. W. *Squatarola helvetica* (Linn.).

88. N. W. *Rhinoptilus chalcopterus* (Temm.). (*Cursorius chalcopterus*, Temm.) This, with the nearly allied *M. bitorquatus*, Blyth, of India, form a very distinct group, connecting *Cursorius* with *Charadrius*. Mr. Blyth first formed it into a genus, under the name of *Macropterus* (Journ. Asiat. Soc. Beng. vol. xvii. part 1. p. 254); but as the name has been previously used by Lacépède for genera of mammals and of birds, and by Schönherr for a coleopterous insect, I

propose the name *Rhinoptilus*, indicating the advanced position of the frontal feathers, which, with other characters, distinguish it from *Charadrius*.

89. N. *Chaetusia gregaria* (Pall.).

90. W. *Lobivanellus albicapillus* (Vieill.). (*Vanellus strigilatus*, Swains.)

91. W. *Hoplopterus persicus* (Bonn.). (*H. spinosus*, auct. recentiorum.)

92. W. *Sarciophorus pileatus* (Gm.).

93. *Charadrius hiaticula*, Linn.

94. *Charadrius alexandrinus*, Linn. (*C. cantianus*, Lath.)

95. *Charadrius pecuarius*, Licht.

96. W. *Ardeola coromanda* (Bodd.). (*Ardea coromandelensis*, Kuhl; *A. coromandelica*, Licht.; *A. affinis*, Horsf.; *A. russata*, Temm.; *A. bicolor*, Vieill.; *A. ruficapilla*, Vieill.; *A. bubulcus*, Audouin; *A. caboga*, Franklin; *A. verrani*, Roux; *A. lucida*, Raff.; *Leptodas ibis*, Ehrenb.) I could have wished that M. Rüppell had given us the diagnoses of *A. bubulcus* and *coromandelica* when he pronounced them distinct. As far as my own comparisons extend, the African and Indian birds are specifically the same.

97. *Botaurus stellaris* (Linn.).

98. *Grus cinereus*.

99. W. *Ciconia alba*.

100. *Ibis æthiopica*.

101. W. *Glottis canescens* (Gm.). (*G. chloropus*, Nilss.)

102. W. *Totanus hypoleucus* (Linn.).

103. W. *Pelidna minuta*, Leisl.

104. W. *Pelidna subarquata* (Gm.).

105. *Machetes pugnax* (Linn.).

106. *Crex pratensis*, Bechst.

107. W. *Sarkidiornis africana*, Eyton.

108. *Chenalopex ægyptiacus*.

109. W. *Dendrocygna viduata* (Linn.). We have the authority of Jacquin, Azara, and other authors, for the occurrence of this bird in S. America. If this be the case, it will form the *only known instance* of a non-marine bird being indigenous to both the African and South American continents, without occurring in Europe, Asia, or North America. Before, however, admitting this remarkable exception to the laws of geographical distribution, the absolute specific identity of the African and American specimens should be established by careful comparison, which, as far as I am aware, has not yet been done.

110. *Sterna anglica*, Mont.

111. *Hydrochelidon nigra* (Linn.).

112. W. *Pelecanus rufescens*.

2. SYNOPSIS OF THE SPECIES OF DEER (CERVINA), WITH THE DESCRIPTION OF A NEW SPECIES IN THE GARDENS OF THE SOCIETY. BY J. E. GRAY, ESQ., F.R.S. ETC.

(Mammalia, Pl. XXII.—XXVIII.)

The Deer, spread over all parts of the Globe, are easily recognized by their deciduous horns, which are covered, when they are first developed, with a hairy skin.

It has been supposed that the Deer were not to be found in Africa, but the discovery of a species in Barbary has dispelled that idea; they are rare in that extensive quarter of the world, their place being supplied by Antelopes.

Since the publication of Cuvier's Essay on Deer, in which he described several species from the study of the horns alone, many zoologists have almost entirely depended on the horns for the character of the species, and Colonel Hamilton Smith has been induced to separate some species on the study of a single horn. But the facilities which menageries have afforded of studying these animals, and watching the variations which the horns of the species present, have shown that several most distinct but allied species, as the Stag of Canada and India, have horns so similar that it is impossible to distinguish them by their horns. On the other hand, it has been shown that animals of the same herd, or even from the same parents, and sometimes even the same specimen, under different circumstances, in succeeding years have produced horns so unlike one another in size and form, that they might have been considered, if their history was not known, as horns of very different species. These observations, and the examination of the different cargoes of foreign horn which are imported for the uses of the cutler, each cargo of which is generally collected in a single locality, and therefore most probably belong to a single species peculiar to the district,—have proved to me that the horns afford a much better character to separate the species into groups, than to distinguish the allied species from one another.

Colonel Hamilton Smith, in his Monograph of the Genus, separated them into subgenera according to the form of the horns.

In the Proceedings of the Zoological Society for 1836 I drew attention to the glands on the hind-legs as affording very good characters to arrange the subgenera proposed by De Blainville and Colonel Smith into natural groups, which in most particulars agreed with the geographical distribution of the species.

Dr. Sundevall, in his Essay on Pecora, has availed himself of the suggestions in my paper, and has also pointed out some other external characters, such as the form and extent of the muffle, which afford good marks of distinction in these animals,—such as I believe are much more important for the distinction of the genera and species than those derived from the form of the skull or the modifications of the teeth, or the form and size of the horns; as they are not, like those parts, so liable to alteration from age, local circumstances and

other changes during the growth of the animal, and they can be seen in the females as well as the males, which is not the case with the horns, as they can only be observed in the male sex.

The Deer may be thus divided :

- A. The DEER OF THE SNOWY REGIONS have a very broad muzzle, entirely covered with hair ; the horns are expanded and pal-mated, and the fawns are not spotted.
- a. The *Alcine Deer* have no basal anterior snag to the horns, and a small, bald muffle between the nostrils, as the genus *Alces*.
- b. The *Rangerine Deer* have a large basal anterior snag to the horns, close on the crown or burr, and no muffle, as *Tarandus*.
- B. The DEER OF THE TEMPERATE OR WARM REGIONS have a tapering muzzle, ending in a bald muffle ; the fawn, and some-times the adult, are spotted.
- c. The *Elaphine Deer* have a distinct anterior basal snag to the horns, the muffle broad, and separated from the lip by a hairy band, and the tuft of hair on the outside of the hind-leg above the middle of the metatarsus, as *Cervus* and *Dama*.
- d. The *Rusine Deer* have a distinct anterior basal snag to the horns, the muffle very high, and not separated from the edge of the lip, and the tuft of hair on the outside of the hind-leg above the middle of the metatarsus, as *Recervus*, *Panolia*, *Rusa*, *Axis*, *Hyl-elaphus*, and *Cervulus*.
- e. The *Capreoline Deer* have no basal anterior snag to the horn, the first branch being some distance above the burr ; the suborbital crumen (and pit in the skull) generally small, as *Capreolus*, *Cariacus*, *Blastocerus*, *Furcifer*, and *Coassus*.

The *Alcine* and *Rangerine Deer* are confined to the Northern part of both continents ; the *Elaphine* and *Rusine Deer* to the Eastern World, the latter almost exclusively to the warmer part of Asia ; the *Capreoline Deer* are peculiar to America. The only exception to these rules are, the Wapiti Deer of the Elaphine group is found in Northern America, and the *Roebuck* and *Ahu* of the *Capreoline* group are found in Europe and North Asia.

A. The DEER OF THE SNOWY REGIONS have a very broad end to the nose, which is entirely covered with hair, a short tail and pal-mated horns ; the fawns are not spotted, but uniformly coloured like the adult ; the skull with a large nose-cavity, and with the intermax-illaries not reaching to the nasal.

a. The ALCINE DEER or ELKS have no basal snag, the first branch of the horn being considerably above the crown.

1. ALCES; *Alce*, H. Smith.

The muzzle is very broad, produced, and covered with hair, but there is a small, moist, naked spot in front of the nostrils; the neck is short and thick; the hair is thick and brittle; the throat is rather maned in both sexes; the hind-legs have the tuft of hair rather above the middle of the metatarsus; the males have palmate horns. The nose-cavity in the skull is very large, reaching behind to a line over the front of the grinders; the intermaxillaries are very long, but do not reach to the nasal; the nasals are very short. They live in woods in the northern parts of both continents.

1. ALCES MALCHIS. The ELK or MOOSE.

Dark brown; legs yellow.

Alces, Gesner; Plin.—*Cervus Alces*, Linn. S. N. i. 92; Pallas, Zool. R. A. i. 201; H. Smith; Richardson, Fauna Bor. Amer. 232.—*Alces Malchis*, Ogilby, P. Z. S. 1836, 135; Gray, Knows. Menag. 56.—*Moose Deer*, Dudley, Phil. Trans. n. 368. 165.—*Elk*, Laws, Carol. 123; Pennant, Syn.—*Elan*, Brisson, H. N. xii. t. 7. Supp. vii. t. 25; Cuvier, R. A.—*Orignal*, La Houtan, Voy. 72; Charlev. Nouv. France, iii. 126.—*American Black Elk* (*C. alces* β.), H. Smith, G. A. K. v. 771.—*Loss*, Russians in Siberia.

Inhabits the Northern regions of America and Europe.

Several naturalists, especially Colonel Hamilton Smith, thought they had observed a difference in the horns of the Russian and American Elks; I have compared numerous specimens from both countries, but can discover no appreciable distinction between them.

The Elks, like most of the other Deer, and especially of the animals which inhabit the cold and mountain regions, present a very considerable difference in size, according to the scarcity or abundance of the food which the locality they inhabit affords, and the development of the horns appears to be greatly influenced by this cause; so that the horns of the animals inhabiting the more barren districts are much less developed than those found in more fertile situations, and I think I have observed this to be the case with both the Russian and the American horns: but on this head naturalists are like to be much misled, as the horns which are imported are generally chosen for their size and perfect development, and the small and less-developed specimens are only to be observed in the cargoes of horns which are imported for economic purposes.

These observations are equally applicable to the *Rein Deer*.

6. The RANGERINE DEER or REINS have a large and well-developed basal branch close on the crown of the horns.

2. TARANDUS; *Rangifer*, H. Smith.

The muzzle is entirely covered with hair; the tear-bag small, covered with a pencil of hairs; the fur brittle, in summer short, in winter longer, whiter, of the throat longer; the hoofs are broad, depressed, and bent in at the tip; the external metatarsal gland above